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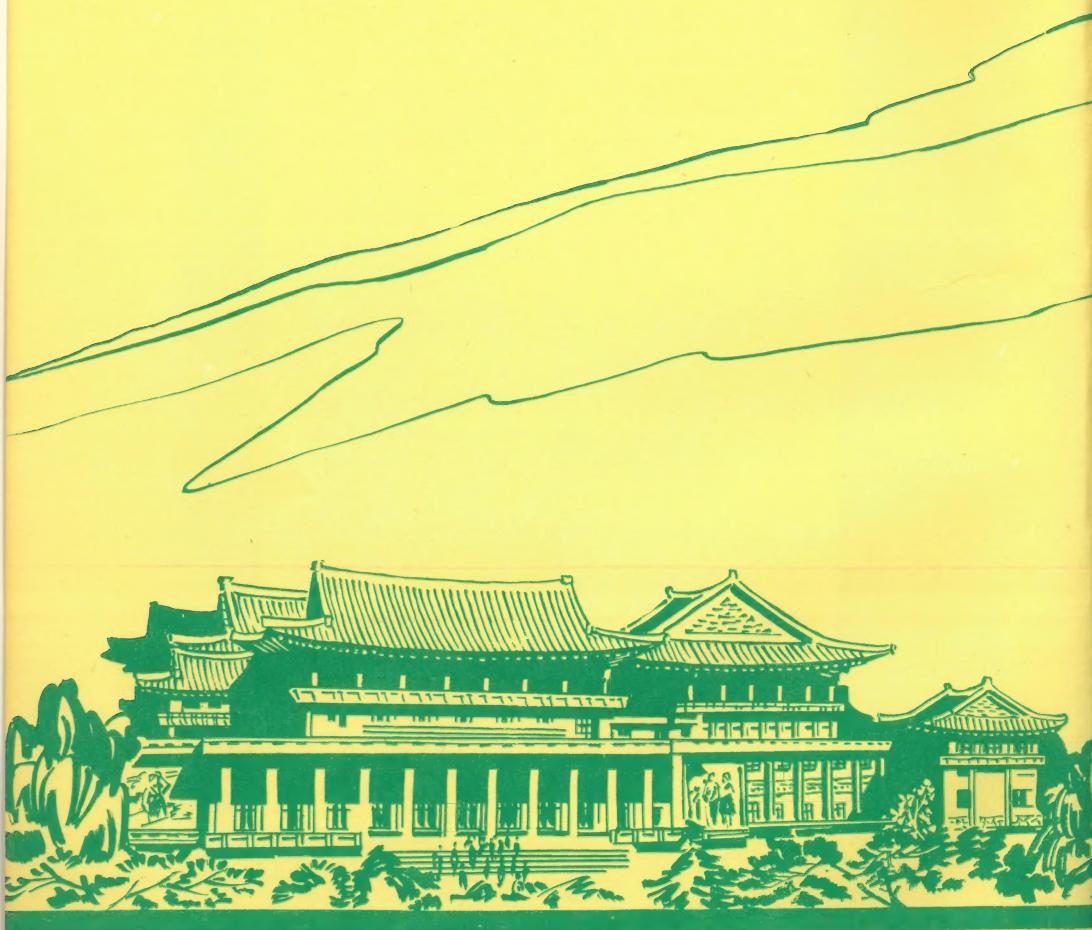
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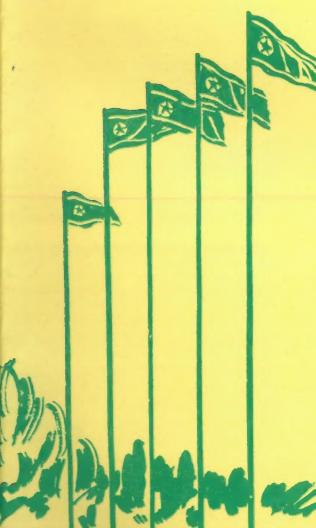
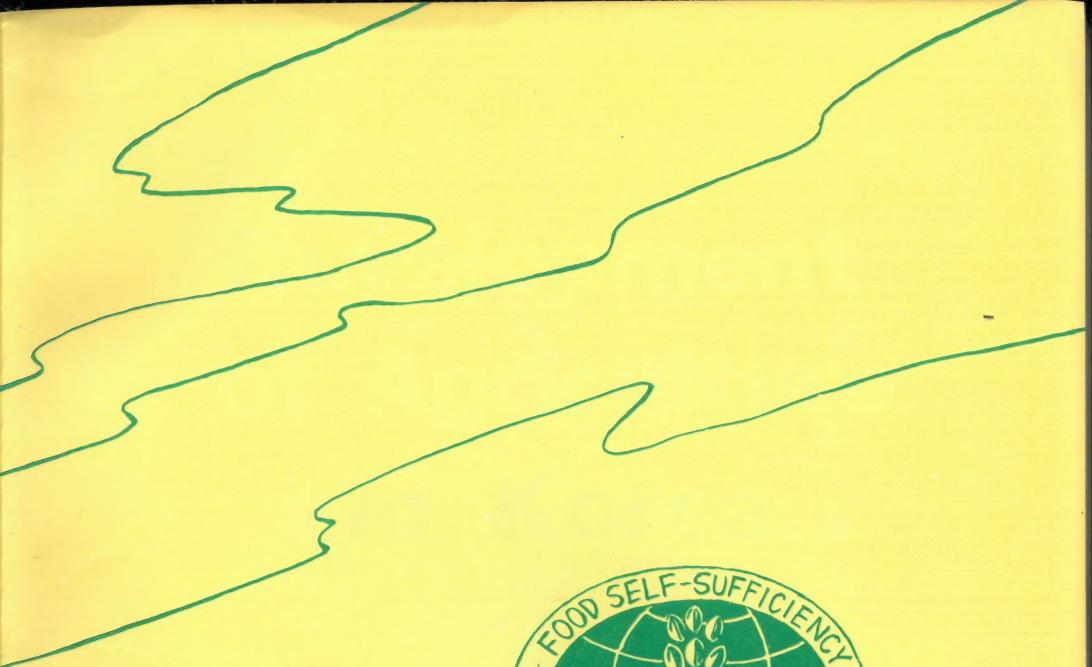


Development of Agriculture in Korea

PYONGYANG, KOREA

1983



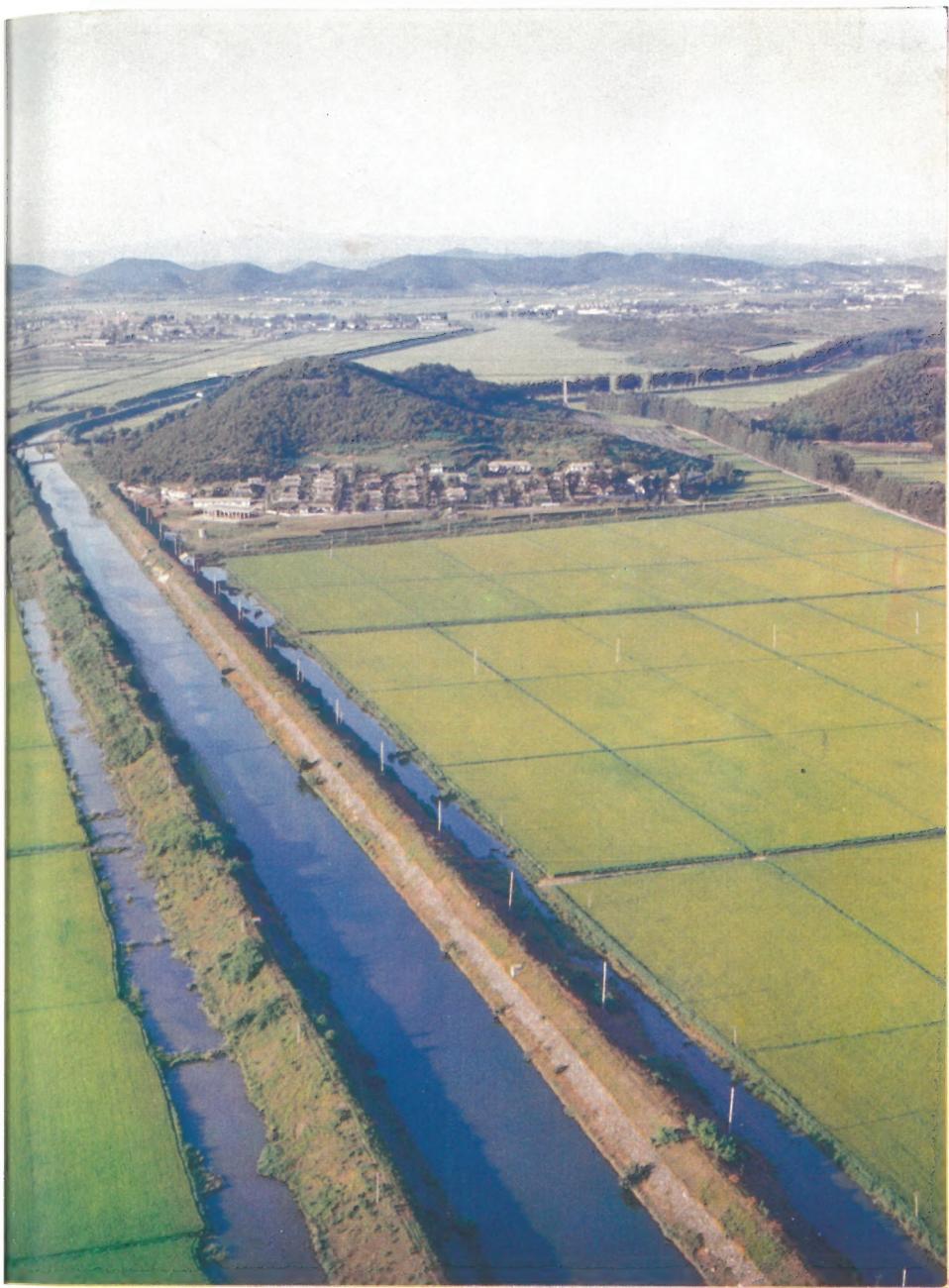


Development of Agriculture in Korea

Foreign Languages Publishing House
Pyongyang, Korea
1983



The great leader Comrade Kim Il Sung gives on-the-spot guidance to the Samjigang Cooperative Farm



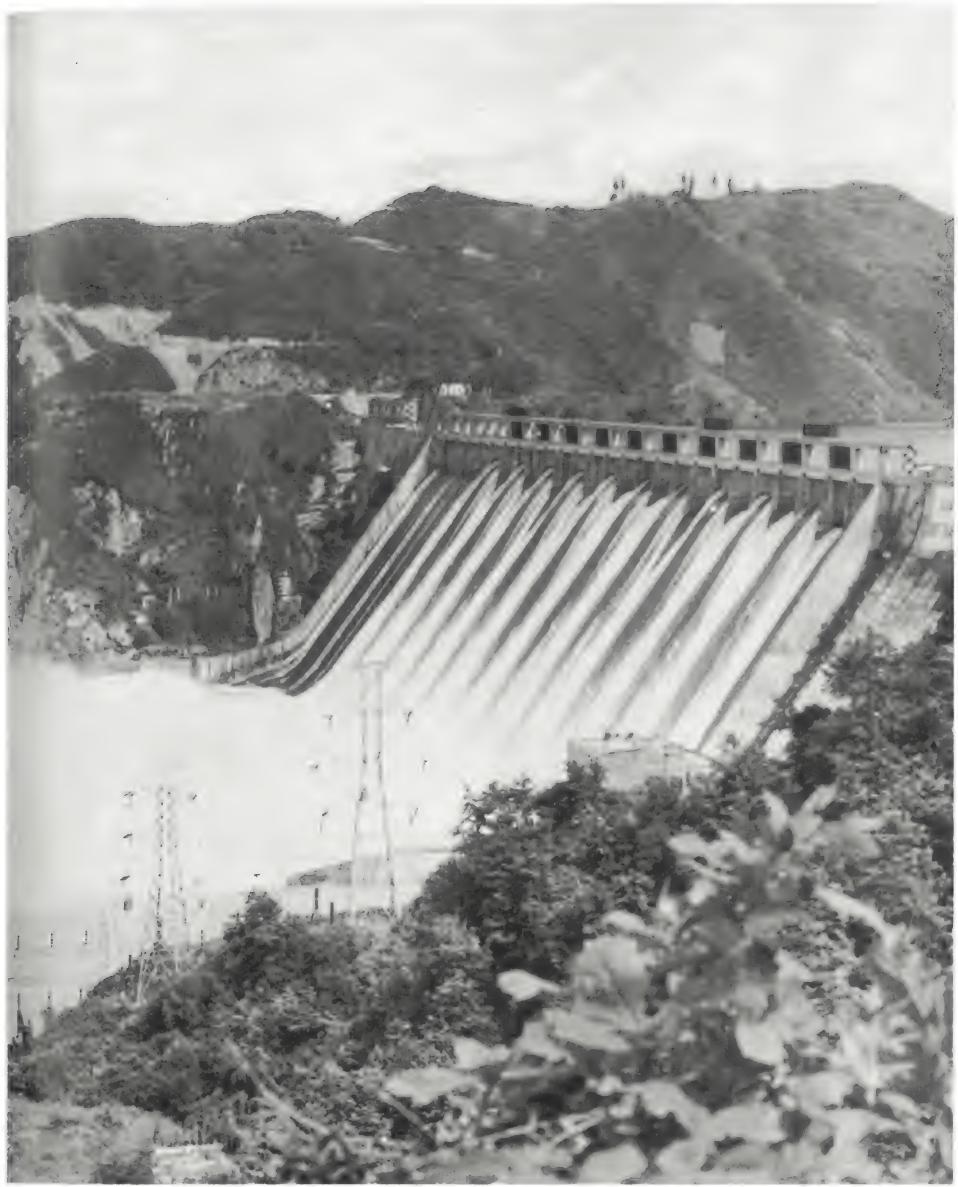
The fields of socialist cooperative farms are crisscrossed with irrigation channels brimming with life-giving water



Sprinklers in action in a market garden



Drought is overcome with water drawn from wells



Enough power is produced for the countryside



Rice seedling pullers supersede manual labour



Maize fields are weeded by machine



Rice seedlings are transplanted mechanically



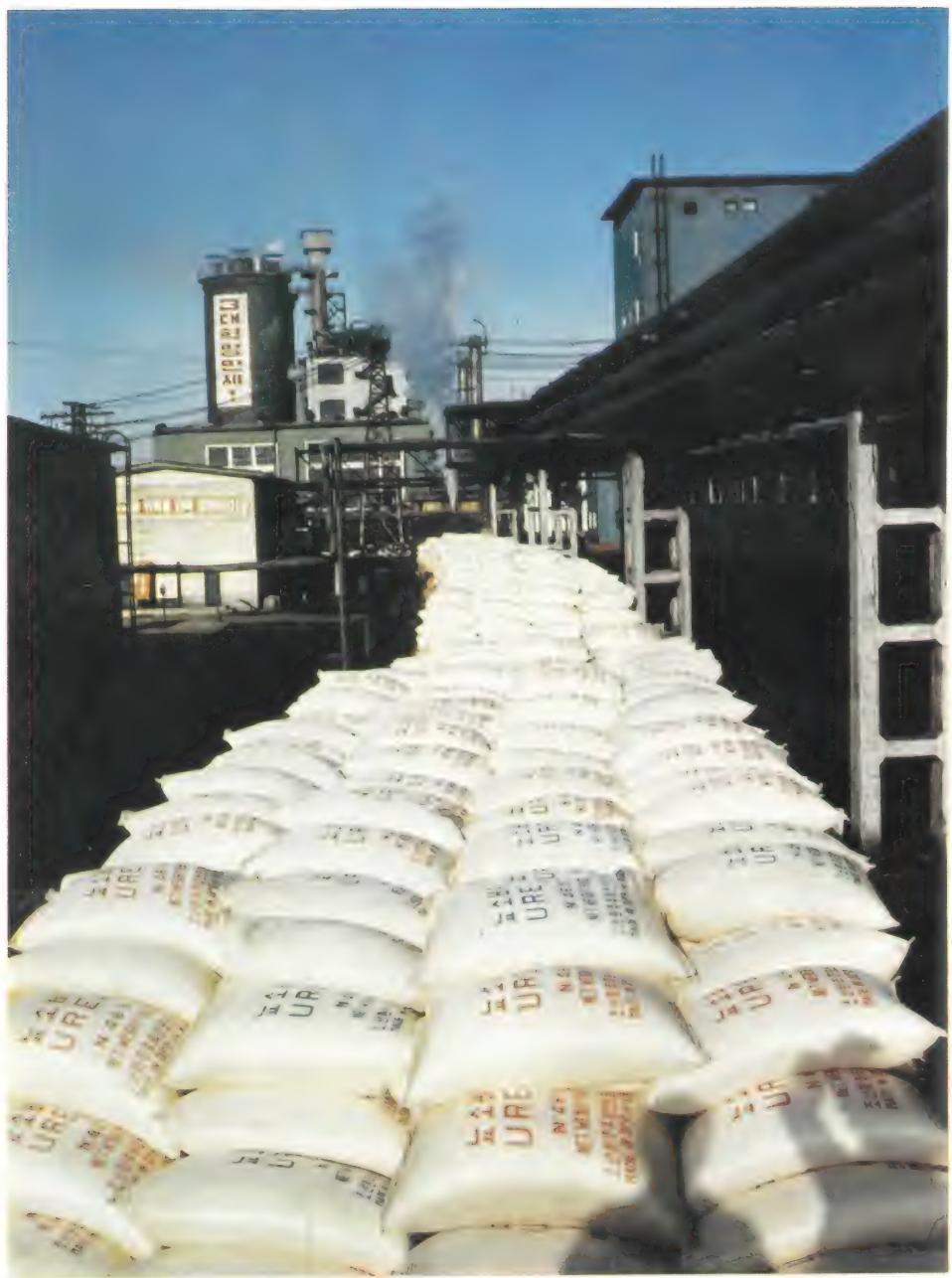
Now rice harvesting is great fun



Mechanized maize harvesting



A harvester combine in action in the wheat fields



Plenty of chemical fertilizer is turned out



Crop-dusting



Spraying of weed killer



Agro-scientists at work
in the laboratory



Farmers studying the
Juche farming method
in the "agricultural
science and technol-
ogy publicity hall"



Water in the paddy fields is
adjusted after measuring
its temperature

Preliminary investigation
to prevent blight and
insects





A bumper harvest is gathered in every year in spite of the influence of the cold front





A rich crop of vegetables



The apple trees are over-burdened with fruit



A bird's-eye view of the Mangyongdae Chicken Plant which has been built under the solicitude of the fatherly leader



The interior of the Kaesong Chicken Plant



A general view of the Pyongyang Pig Plant which bears a large share in meat production



An automated breeding room of the Pyongyang Pig Plant



Socialist farm villages whose appearance changes day by day (Top: the Ryongnim Cooperative Farm, Mundok County, South Pyongan Province. Bottom: the Oguk Cooperative Farm, Anak County, South Hwanghae Province)



This book contains the speeches delivered and treatises submitted by the delegation of the Democratic People's Republic of Korea at the "Symposium of the Non-aligned and Other Developing Countries on Increasing Food and Agricultural Production" held in Pyongyang in August 1981.

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Brilliant Solution of the Food and Agricultural Question in Our Country

The correct solution of the food and agricultural question is one of the most important tasks arising in the building of a new society.

The great leader President Kim Il Sung said:

"For any country the correct implementation of its food policy is of great importance." (Kim Il Sung, *Works*, Eng. ed., Vol. 2, p. 493.)

To solve the food and agricultural question correctly through good farming constitutes an important guarantee for the improvement of the people's living standard and the successful building of a new prosperous society.

In the early stage of building a new society we adopted a correct policy for the solution of the food and agricultural question and thoroughly implemented it. As a result, this question was resolved with credit. In this course we accumulated valuable experiences.

We took over a backward and deformed agriculture from imperialist colonial rule. Before liberation the level of our agricultural production was very low. The annual gross output of grain in the northern half of our country in those days was 2,167,000 tons. The output of vegetables, industrial crops, livestock products and fruit was also at a low level.

Thus, immediately after liberation our country remained a territory absolutely short of provisions and found it hard to supply light industry with enough raw materials.

In this situation, it was of key importance to do farming well and quickly increase grain and other agricultural products and correctly solve the food and agricultural question. On it depended the success of the building of a new society.

We put forward the policy of diversified development of agriculture with the main emphasis on the self-sufficiency of food, which we thoroughly carried out.

Strict adherence to this principle is a sure guarantee for

self-sufficiency in food and full satisfaction of the demands of the national economy for various agricultural products.

Our government has pursued correct policies to attain self-sufficiency in food.

First, in order to increase food and agricultural production we energetically carried out nature-remaking projects and pushed forward the rural technical revolution, laying the solid material and technical foundations of agriculture.

Above all, we actively developed lands and made effective use of them for agricultural production.

In our country mountains account for about 80 per cent of the territory, so the cultivated land forms a small proportion—only two million *chongbo* (One *chongbo* equals 9,917.36 square metres) including even orchards and mulberry fields. The crop area exclusive of orchards and mulberry fields is no more than 1.6 million *chongbo*.

For the rapid increase of agricultural production under such circumstances, we had to actively develop lands and make effective use of them.

In the postwar years we rehabilitated the fallow, waste and war-damaged lands; built more orchards and mulberry fields on hillsides; carried out great nature-remaking projects for irrigation; turned dry fields into paddies; and reclaimed tidelands. For this purpose we launched vigorous all-people campaigns. Meanwhile, we took various measures to actively improve and preserve existing lands, so that the land resources of the country were used more effectively for agricultural production.

In particular, for the most effective utilization of the land resources we expanded the area under rice, a high-yielding crop, by turning dry fields into paddies. At the same time, we actively increased the area sown to maize under the slogan "Maize is the king of dry field crops". This was an important factor making for a sharp increase in our grain production.

In our country an energetic struggle for developing lands is now going on in accordance with the brilliant plan mapped out at the historic Sixth Congress of the Workers' Party of Korea, that is, to reclaim 300,000 *chongbo* of tideland and obtain 200,000 *chongbo* of new land by the end of the 1980's.

Along with the development of lands we directed special attention to actively tapping water resources for use in irrigation.

Unlike industry, agriculture is greatly affected by climate, so it is impossible to ensure a high and stable crop in agriculture without tapping water resources for irrigation extensively.

Furthermore in our country where rice cultivation forms a large proportion and which is plagued by a long dry spell in spring and floods in summer, it is of decisive significance in increasing agricultural production to establish a well-regulated irrigation system and prevent damage by flood and drought.

However, before liberation there was no irrigation system to speak of in our country. The irrigated area was only 100,000 *chongbo* and most of the paddies were rain-dependent.

Such being the situation, the solution of the water problem through irrigation projects was very urgent after liberation.

Therefore, we defined irrigation as the most important and foremost task in the rural technical revolution and directed efforts to it from the early post-liberation days with a firm determination to solve at any cost the water problem for agriculture by ourselves. As a result, already in 1946, the year after liberation, 19 irrigation projects were completed, the large-scale Pyongnam Irrigation Project started with state investments, and 88 new projects undertaken.

After the completion of agricultural cooperativization, in particular, an all-people, nationwide movement was vigorously launched for irrigation, afforestation and water conservancy works.

In order to push ahead vigorously with irrigation works we adopted the policy of combining large-scale irrigation and river improvement projects with medium- and small-scale ones, and saw to it that large-scale projects were undertaken directly by the state in view of the amount of investments and technical requirements, and medium- and small-scale ones by cooperative farms themselves with technical assistance from the state.

Thus, in our country irrigation for paddies has already been completed, nearly all dry fields, excepting those on steep slopes, have been brought under irrigation and the water sprinkling system widely introduced in the vegetable gardens and two-crop areas.

Now our country has more than 1,500 reservoirs with a water-storage capacity of over 298,000 *chongmi* (One *chongmi* approximates 10,000 m³). And the number of pumping stations exceeds 23,700 and irrigation canals have a total length of over 40,000 kilometres which is equal to the circumference of the earth. The irrigated area in our country is 1.2 million *chongbo*, or 75 per cent of the paddy and dry fields which total 1.6 million *chongbo*.

While striving to establish an irrigation system, we put great efforts to drainage works and have set up 1,340 drainage pumping

stations, laid 1,460 kilometres of waterways for drainage and created a draining capacity of hundreds of thousands of horsepower. This has completely freed the major rice-producing areas from the damage of stagnant water.

In order to cope with the damage of severe droughts caused by abnormal climate in recent years, ample measures were taken to draw and use underground water by digging wells and driving pipes into the ground in all parts of the country. Our country now has 94,700 wells, 14,400 ponds and 15,700 pipes driven underground.

In this way, permanent and complete irrigation systems have been established to do farming on a stable basis under whatever adverse weather conditions, and the water problem completely solved to meet the centuries-old desire of our peasants.

While remaking nature through irrigation projects, we set electrification, mechanization and chemicalization as important tasks of the technical revolution in the countryside and have dynamically pushed them forward.

Electrification was completed long ago. 100 per cent of the farmhouse have electricity and all the stationary farming operations are done by electricity.

We paid deep attention to equipping agriculture with modern machines and techniques.

Before liberation the level of technical equipment of our agriculture was very low. The peasants did not know the word "farm machine" and did all farm work by manual labour with small primitive farm implements, carrying loads on their backs. As a result, agricultural production was underdeveloped and agricultural labour very arduous and inefficient.

Therefore, farm mechanization was one of the decisive conditions for the future development of our agriculture.

However, we were not in a position to supply the countryside with modern farm machinery immediately because we had taken over one-sided colonial industry from foreign imperialism and, worse still, it had been destroyed.

Taking this situation into account, we started with the work of improving conventional small farm implements. We built factories of small farm implements in different places and mass-produced them to supply them to farms.

At the same time, farm-machine hire stations were set up in major grain-producing areas as a preparatory step for the mechanization of agriculture. Their tractors ploughed the fields for

the peasants, thereby making them know how good modern farm mechanization was.

With the completion of agricultural cooperativization, farm mechanization stood out as an urgent demand. In our country agricultural cooperativization had preceded technical reconstruction, and so without hastening mechanization it was impossible to bring the advantages of the newly organized cooperative economy into full play and to develop agricultural production rapidly.

To mass-produce modern farm machines including tractors and send them to the countryside was a prerequisite for the mechanization of agriculture.

But this was a very difficult job as we had no experience and were wanting in technology. However, our workers and technicians boldly resolved to make tractors by themselves. At last by displaying the spirit of self-reliance and fortitude, they succeeded in making them with their own strength, materials and technique.

The production of tractors on our own was an epoch-making event in the acceleration of agricultural mechanization.

Our farm mechanization progressed in full force from the time when the foundation of an independent national economy was laid and tractors and various other farm machines manufactured in quantities.

In our country rice farming assumes a large proportion and natural and geographical conditions differ from locality to locality. Taking this into account, we followed the principle of introducing mechanization first in plain areas where paddy fields dominated and then in intermediate zones and mountain areas, and of starting mechanization with difficult and labour-consuming work and then gradually proceeding to comprehensive mechanization of all other work.

For the successful mechanization of agriculture we built many factories such as modern tractor factories, automobile factories, tractor spare parts factories and trailer farm implement factories in different parts of the country, so that various farm machines and implements suited to the specific conditions of our country were mass-produced. Besides, we trained large numbers of drivers and sent them to the countryside with the increase of trucks and tractors there.

Thus in 1979 the number of tractors allotted to every 100 *chongbo* of cultivated land reached 7 in plain areas and 6 in intermediate and mountain areas, and the comprehensive mechanization of agriculture is nearing completion. Now the rate of mechanization in major farming operations is 100 per cent in

ploughing, 95 per cent in rice transplanting, 70 per cent in harvesting, 100 per cent in threshing and carrying.

Our struggle for farm mechanization has now entered a new stage. We are striving to bring the number of tractors per 100 *chongbo* to at least 10-12 in the near future and thus accomplish the tasks put forward in the rural theses for completing comprehensive farm mechanization and for industrializing agriculture.

We also directed great efforts to the chemicalization of agriculture.

We channeled vast energies into the production of fertilizer, under the slogan "Fertilizer precisely means grain and grain, socialism". As a result, the amount of chemical fertilizer applied to each *chongbo* of field has already reached 1.6 tons and we are now endeavouring to raise it to the level of over 2 tons.

As a result of producing and supplying various effective agricultural chemicals including weed killers, the paddy fields weeded by chemical means now account for 97 per cent of the total area under rice cultivation, and the weeding of maize fields is mostly done with herbicide.

Secondly, we firmly believed it to be an important means of developing agriculture to improve and perfect farming method continuously, and thoroughly applied the great Juche farming method.

Agriculture is a biological process of tending and growing crops that are living organisms. So, even if it is done with modern machinery and technique, it cannot achieve good results without applying scientific farming methods.

Proceeding from the importance of advanced farming methods in agricultural production, we devoted considerable efforts to the improvement and perfection of farming methods while ceaselessly improving agricultural technique.

The creation of the great Juche farming method by Comrade Kim Il Sung, the respected leader of our people, was an event of epochal significance in improving and perfecting farming methods and placing them on a new scientific basis.

Having acquired a clear insight into the fundamental requirements of developing agriculture in our time and the effects of the abnormal climate on agricultural production, the respected leader Comrade Kim Il Sung generalized the historical experiences in agriculture of Korea and other countries of the world through deep thinking and exhaustive investigations and thus created the great Juche farming method, a highly intensive scientific farming method which accords with the actual conditions of our country.

The great Juche farming method created by the respected leader is an embodiment of the Juche idea. In other words, it is the most advanced farming method which renders it possible to attain high yields on the basis of the independent and creative activities of the masses of peasants, masters of farming, and with the help of modern science and technology.

The great Juche farming method is an integral systematization of the basic principles, processes and methods of farming. It throws full light on the orientation and ways for the effective use of natural environments and material and technical means in all processes of farm work.

Therefore, we thoroughly carried out the great Juche farming method as one of the most important ways for the development of agricultural production.

First of all, in order to apply thoroughly the plant-by-plant or cluster-by-cluster farming principle laid down by the great Juche farming method, we vigorously pushed ahead with the green revolution and produced many new varieties of high-yielding crops which can be planted thickly. At the same time, we took agronomical and technical measures for steadily increasing land fertility and carefully tending the crops plant by plant or cluster by cluster.

In particular, we made efforts to do farming on a scientific and technical basis on the principle of planting the right crop on the right soil in the right time as indicated by the great Juche farming method. We also made an examination and analysis of soil of the cultivated land throughout the country and carried out in an all-round way the work of studying agricultural climate and investigating the real state of affairs. On this basis, we introduced farming techniques and methods to do well and timely all farm work—distribution of plots for crops and varieties, manuring, water control, etc., —according to scientific and technical principles.

Like this, by taking various positive measures for highly intensifying agricultural production and raising crops scientifically and technically as required by the Juche farming method, our country has reaped a bumper harvest every year in spite of the abnormal climatic phenomena in recent years.

Our experience shows that to strengthen the material and technical foundations of agriculture by carrying out nature-remaking projects on a large scale and stepping up the rural technical revolution and, at the same time, to create and introduce scientific farming methods suited to the specific conditions of one's own country is a dependable guarantee for rapid development of

agricultural production and satisfactory solution of the food problem by one's own efforts.

Thirdly, for the successful solution of the food and agricultural problem we worked hard to increase the awareness and creative initiative of the farmers, the food producers, and to enhance their cultural and technical levels.

Immediately after liberation there were 2.3 million adult illiterates in the northern half of our country. They were mostly peasants.

In this situation, if we were to increase the peasants' consciousness as masters and raise their cultural and technical levels, we had to eliminate illiteracy in the countryside before anything else.

"Adults' schools" were set up in every nook and corner of the country and an all-people crusade against illiteracy was developed vigorously. As a result, illiteracy was completely stamped out in the countryside by the beginning of 1949. This was a historic victory.

We took measures to provide the uneducated peasants with an opportunity of systematically acquiring the general knowledge at the primary school level. To this end, we further developed adult education. We also built democratic publicity halls in rural ri and villages and, using them as the bases, conducted various enlightenment work including dissemination of scientific knowledge.

When the demand for raising the cultural and technical standards of the peasants became all the more urgent with the cooperative reorganization of private farming and the rapid development of agricultural science and technology, we put forward the task of raising their level to that of the middle school graduate and enrolled all the farming population who had had no access to secondary education in the working people's middle schools so as to enable them to acquire general knowledge and agro-technical know-how. As a result, the general cultural and technical levels of the peasants reached those of the middle school graduate. At the same time, a hall for the dissemination of knowledge of agricultural science and technology was set up in every rural ri to spread it widely among the farmers.

At present our well-educated and enlightened farmers are devoting all their energies and talents to the work for the fatherland and the people, for society and collective under the slogan "One for all and all for one!"

While raising the cultural and technical standards of the farmers, we also directed great efforts to the training of agro-techni-

cians. Thus, an agricultural university was set up in each province and an agricultural college in each county to meet the local demands for them.

With the successful implementation of the policy of training large numbers of agro-technicians, today every cooperative farm in our country has 57 technicians and specialists on an average.

On the basis of the achievements made in enhancing the cultural and technical standards of the farming population and in training agro-technical cadres, we are now striving to carry out the task of equipping all farmers with the general knowledge of the senior middle school graduate and more than one kind of technical skill in the near future. Our long-range objective is to turn all farmers into intellectuals.

Fourthly, for the rapid development of agricultural production and successful solution of the food and agricultural problem, we paid great attention to strengthening state support to the countryside in accordance with the *Theses on the Socialist Rural Question in Our Country*.

It is an essential requisite for hastening the whole work of building a socialist countryside and thus eliminating the distinctions between town and country and rapidly developing agricultural production that the state focuses its attention on rural work and renders active support to the countryside while energetically developing industry.

The countryside is lagging behind the towns in all spheres of ideology, technology and culture.

This backwardness of the countryside is a legacy of the old society. Therefore, quickly eliminating rural backwardness through increased support of towns to the countryside is an essential requirement for the consolidation and development of the socialist agricultural system and successful solution of the rural question.

If the state neglects rural work and gives no assistance to the countryside, only develops industry at the expense of agriculture and builds up urban communities at the sacrifice of the rural areas, the countryside will remain backward and the food and agricultural questions will be left unsolved.

Proceeding from the importance of state support to the countryside, we rendered every possible help to the countryside from the first days of the building of a new society and fought and overcame the idea of neglecting the rural areas in good time.

Pursuant to the policy of giving overall support to the countryside, tractors, trucks and other farm machines, and various

chemical means such as chemical fertilizers and agro-chemicals have been produced and supplied in large quantities to the countryside and scientific and technical assistance strengthened steadily. Farming operations have seasonal limitations, and so in the busy seasons such as of rice-transplanting and harvest every year, the whole society turns out to give a helping hand to the farmers.

Further, we give great financial assistance to the countryside; we have a powerful independent national economy to ensure large state revenues. In our country agricultural tax-in-kind and all other taxes were completely abolished long ago, and so our farmers are living in the first tax-free countryside in the world. And state loans given to the peasants and cooperative farms with weak economic foundations were written off and prices of agricultural products raised. This increased the incomes of the farmers.

In addition, large numbers of production facilities including threshing grounds and drying sheds, modern dwelling houses and cultural and welfare service facilities were built with state funds and handed over free to the cooperative farms. Modern houses built for the rural population by the state between 1964 and 1980 alone exceeded 957,000.

We also strengthened cultural assistance to the countryside. Rural clinics have been turned into hospitals, water and bus services introduced in the rural areas, and the countryside covered with radio-rediffusion and T.V. networks with success, and the cultural living conditions of our farmers have been decisively improved.

With the successful fulfilment of the tasks set out in the *Theses on the Socialist Rural Question in Our Country* published by the great leader Comrade Kim Il Sung, the ideological, technical and cultural revolutions have displayed great vitality and the food and agricultural questions have been solved with credit.

In our country which had produced no more than 2,167,000 tons of grain in 1944 under imperialist colonial rule grain output showed high rates of growth— 2,790,000 tons in 1949, 3,803,000 tons in 1960, 7,000,000 tons in 1974, and 9,000,000 tons in 1980.

In the past our country only produced 2-3 tons of rice or at best 4 tons, and 1.5-2 tons of maize per *chongbo*. Today the figures rose to 7.2 tons for rice and 6.3 tons for maize, and many cooperative farms in the plain areas produce 8-9 tons or upwards.

With the rapid growth of grain production our country which was short of food in the past has now attained complete self-sufficiency in provisions.

Along with grain output, the production of vegetables, tobacco and other industrial crops has also steadily increased and other sectors too rapidly developed in our country.

The output of vegetables went up 2.5 times between 1960 and 1980, and fruit more than 4.7 times between 1960 and 1979. In particular, modern chicken, duck and pig plants have been built everywhere, so that livestock products have increased rapidly. Meat production rose 11.83 times and eggs 91 times from 1949 to 1980.

In this way our agriculture has been completely cleared of the backwardness and deformity of a colonial agriculture where too much stress was put on grain production. It has now turned into an agriculture with an independent and many-sided structure, which supplies sufficient food and industrial raw materials on its own, and into a solid food and raw material supplier of the country.

Brilliant Victory of the Great Leader Comrade Kim Il Sung's Immortal Classic Theses on the Socialist Rural Question in Our Country

Seventeen years have passed since the great leader Comrade Kim Il Sung's immortal classic *Theses on the Socialist Rural Question in Our Country* was published.

When the socialist rural theses was first published, many people took it for the announcement of an ideal. But today this ideal is being turned into a reality.

Through the struggle for implementing the great leader's theses, we have fully proved its correctness and unbreakable vitality.

The rural question comprises the questions of the peasants and agriculture.

The peasant question concerns the socio-economic situation of the peasantry, an ally of the working class, and the agricultural question, the development of the productive forces in agriculture.

The rural question presents itself as an important problem in all stages of the revolution.

In the countries which were, and still are, under the imperialist and colonial yoke, the correct solution of the rural question is absolutely necessary for victory in the revolution and for social progress. Even after the victory of socialist revolution and the socialist reorganization of production relations, the rural question occupies a very important place in the building of socialism and communism.

Whether the rural question is correctly solved or not is a matter of vital importance on which depends the success of the building of socialism and communism.

Only when the socialist rural question is solved correctly will agricultural production make rapid progress and the revolutionization and working-classification of the peasantry be stepped up, so that overall progress of society will be accelerated.

But none could so far show the right way to the solution of

the socialist rural question. It was an urgent demand of our times to point out the correct way to the solution of this question.

This demand was met most brilliantly by the great leader Comrade Kim Il Sung, who illuminated for the first time in history the road to the final solution of the rural question by publishing the *Theses on the Socialist Rural Question in Our Country* on the basis of the undying Juche idea.

The respected leader Comrade Kim Il Sung said:

"For the successful solution of the peasant and agricultural questions under socialism, it is imperative to adhere firmly to three basic principles in rural work.

"First, the technical, cultural and ideological revolutions should be thoroughly carried out in the rural areas;

"Second, the working-class leadership of the peasantry, the assistance of industry to agriculture, and the support of the towns to the countryside should be strengthened in every way;

"Third, the guidance and management of agriculture should be brought continuously to approach the advanced level of enterprise management of industry, the bonds between all-people property and co-operative property should be strengthened, and co-operative property should be steadily brought closer to property of the whole people." (Kim Il Sung, *Selected Works*, Eng. ed., Vol. IV, p. 36.)

As clarified by the great leader, the three basic principles to be followed strictly in rural work and the basic tasks specified in them, constitute a great programme of rural construction for the final solution of the rural question, an inspiring banner which encourages our people to a new struggle and a powerful ideological and theoretical weapon in building socialism and communism.

1. Successful Conduct of Three Revolutions in the Countryside

The great leader Comrade Kim Il Sung set forth in the rural theses the line of three revolutions—ideological, technical and cultural—as the basic principle for the successful solution of the peasant and agricultural questions.

The three revolutions represent a struggle for achieving the Chajusong of the working people.

In order to win the Chajusong of the farming population, the remnants of the old society should be eliminated from all spheres of social life such as politics, economy, ideology and culture and the farmers should be emancipated from all forms of domination and subjugation.

Our rural population were successfully emancipated from class domination and subordination through the revolution of transforming the political and economic systems of the old society, that is, by abolishing the colonial and feudal exploiting systems and reorganizing the old production relations along socialist lines in the rural areas.

But even after the establishment of the socialist system, the remnants of the old society survive considerably in ideology, technique and culture in the countryside, and this gives cause to various distinctions including those between town and country and class distinction between the working class and the peasantry.

The ideological, technical and cultural revolutions should be carried out without fail in order to wipe out the residues of the old society and bring about perfect equality and the Chajusong of the working people.

In carrying on the three revolutions in the rural areas, we held fast to the principle of keeping the ideological revolution well ahead of the technical and cultural revolutions.

Thinking plays the regulating role in the activities of human beings.

In essence, the ideological revolution is an undertaking to remould people, and what is cardinal here is to enhance their role through ideological recasting.

Therefore, while carrying out the tasks of three revolutions in the countryside in a coordinated manner, we always gave priority to the ideological revolution, thus remoulding the thoughts of the peasantry and arousing their revolutionary zeal. This ensured success in settling all problems arising in rural construction.

In order to promote the ideological revolution, we strengthened the education of the farmers in the Juche idea, Party policies and revolutionary traditions and vigorously carried on a struggle against all kinds of old ideologies. We also tightened the revolutionary organizational life of the farming population and carried on the ideological revolution in close combination with the practice of socialist construction.

The vigorous acceleration of the ideological revolution in the countryside brought about a radical change in the ideological and spiritual features, manner of work and way of life of the farmers.

Today our farmers are armed with the great leader's revolutionary idea, the Juche idea, and put unshaken faith in it.

With infinite trust in and loyalty to the great leader and the glorious Party centre that have provided them with today's happiness, our farming population wholly entrust their destiny to the Party and display the revolutionary spirit of unconditionally accepting and carrying out the great leader's teachings and the Party's policies.

Rallied firmly with one mind and one purpose around the great leader and the Party, they are pushing ahead with the revolution and construction confidently along the road indicated by the Juche idea with the revolutionary spirit of self-reliance and fortitude, displaying a high national pride and sense of independence.

They also display the collectivist spirit of helping and pulling one another along for the common goal and interest under the communist slogan "One for all and all for one!" They assiduously work with all devotion, not for their own honour or reward but for the Party and the revolution and in the interests of society and the people.

The rural technical revolution is an important revolutionary task to develop the productive forces of agriculture on to a high level, make the peasants well-to-do and free them from heavy labour. This requires equipping agriculture with modern machinery and technology and extensively introducing the achievements of agricultural science. The rural technical revolution presents itself as an urgent question especially in those countries which have taken over backward agriculture from imperialist colonial rule.

A serious question arises as to which should be given priority—industrialization of the country to facilitate the rural technical revolution or socialist transformation of agriculture.

The great leader Comrade Kim Il Sung advanced the unique idea that agricultural co-operativization was fully possible when life itself urgently demanded the reorganization of the outdated production relations and there were revolutionary forces prepared to carry it out even if modern farm machines were hardly available. Then, he gave sagacious organizational leadership so that co-operative reorganization of agriculture might be successfully completed prior to its technical reconstruction.

So, the rural technical revolution became the most urgent task for the development of the cooperativized socialist agriculture.

Therefore, with the development of industry after the comple-

tion of agricultural co-operativization, we lost no time in setting about the rural technical revolution.

Following the road shown by the rural theses, we defined irrigation, electrification, mechanization and chemicalization as the basic tasks of the rural technical revolution and started with irrigation projects, which we finished long ago.

Many big reservoirs by the world standard such as the Taesong, Yonpung, Manpung and Unpa reservoirs in our country, have been built. They have a pondage of hundreds of thousands of *chongmi*. Besides, wells, ponds and under-ground-water-drawing facilities have been built everywhere.

Our country has 1.6 million *chongbo* of cultivated land, of which 1.2 million *chongbo* is watered by the irrigation system.

In addition to the irrigation system, a drainage system has been firmly established. Pumping stations for drainage are set up wherever water can stand still, and fields and crops are thoroughly protected from the damage of floods, cold and dampness through extensive construction of embankments and seawalls, tree planting and amelioration of damp and cold lands.

Rural electrification was completed in 1969 and electricity was installed in all farm villages and houses. This helps promote the technical and cultural revolutions in the rural areas.

Today our countryside consumes 2,200 million kwh of electricity a year.

The mechanization of agriculture has made good progress. As a result, the number of tractors per 100 *chongbo* of crop area has reached 7 in plain areas and 6 in in-between and mountain regions, and the number of trucks per 100 *chongbo* is 1.5. Rice transplanters have been introduced in all areas and various new farm machines sent to the countryside in great numbers. In consequence, comprehensive mechanization of farm work has reached a high level.

In our countryside today, ploughing, threshing and hauling have been mechanized 100 per cent, rice-transplanting — 95 per cent, and harvesting — 70 per cent.

Farms in the plain areas are waging a vigorous struggle for comprehensive mechanization so that each farmer may tend 5 *chongbo* of paddies or over 10 *chongbo* of dry fields and yield fine crops.

On some farms in the northern highlands where the mechanization of farm work has been made comprehensively a farmer works 30 *chongbo* of wheat field or 10 *chongbo* of potato field.

The great leader wisely organized and guided the chemicali-

zation of agriculture. As a result, the amount of chemical fertilizers applied per *chongbo* reached 1.6 tons in 1980. Large quantities of herbicides and insecticides have been supplied to the countryside, so that crops are thoroughly protected from blights and harmful insects and the backbreaking job of weeding is now done by chemical means.

Today 97 per cent of our paddy fields are weeded with chemicals and most of our maize fields weeded with herbicides.

In our country, the most advanced and scientific Juche farming method is applied thoroughly and research results of agricultural science are widely introduced in production, so that agricultural production has become highly intensive.

Per-*chongbo* rice yield has reached 7.2 tons and maize, 6.3 tons.

Grain output rose to 9,000,000 tons in 1980, whereas it had been 3,803,000 tons in 1960, before the publication of the rural theses.

The production of vegetables increased 2.5 times in 1980 and fruit 4.7 times in 1979 as compared with 1960. In particular, production of meat rose 11.83 times in 1980 as against 1949, and eggs 91 times in the same period.

The rural cultural revolution is an important revolutionary task to elevate the cultural and technical standards of the farmers, train technical cadres for the countryside, change the antiquated looks of the rural areas, liquidate all backward ways of life and customs and build up rural life in a cultured and hygienic way.

As in towns, all children in the countryside are brought up in nurseries and kindergartens at state and public expenses. Universal compulsory eleven-year education is in force, and so all our children and youth are trained gratuitously until the working age to be dependable reserves of socialist and communist construction who are knowledgeable, morally impeccable and physically sound.

Adult education is making brisk headway in the countryside. Most of those who had no schooling in the past have finished the course of working people's middle school and are now striving to attain the intellectual level of the senior-middle-school graduate and acquire one technical skill or more.

Each province has comprehensive cadre training centres including agricultural university, medical university and university of education, and each county—an agricultural college. As a result, legions of able agricultural technical personnel have been trained and every cooperative farm now has 57 technicians and specialists on an average.

A radical change has also taken place in the farmers' living conditions and ways of life.

During the 17 years after the publication of the rural theses over 957,000 modern farmhouses were built at state expense and given to farmers gratis. Communist villages with modern dwellings, cultural facilities and welfare service networks are appearing everywhere.

Our villages not only have electricity installed but are covered by radio rediffusion and TV networks; various publications are distributed to each door; and every *ri* has a house of culture, propaganda halls, barber's shop, public bath, shops and cultural, welfare and service facilities, which help to raise the politico-ideological level of the rural population and their cultural standard.

Bus service and water supply in the countryside have greatly narrowed down the distinctions between urban and rural dwellers in living conditions and provide convenience to the farmers' life.

Rural clinics have been converted into hospitals with success and the rural population, like workers and office employees, receive the benefits of free medical care and their average life span is 74 years, or 36 years longer than before liberation.

2. Intensified Support to the Countryside

The working class's guidance and assistance to the peasantry and the support of towns to the countryside is an indispensable condition for the final solution of the rural question.

The Party and state of the working class must assume all the responsibility for giving full support to the countryside not only in the first period of the building of a new society after liberation from imperialist and colonial yoke but also in the period following the establishment of the socialist system. Only when guidance and assistance are given to the peasantry by the working class, to agriculture by industry, and to villages by towns can the peasantry be working-classified, agriculture industrialized, the countryside raised to the level of towns, and this will bring about the complete victory of socialism and the final solution of the rural question.

Support of the working class to the countryside is an essential requisite to the carrying out of the historical mission of the working class, and it fully conforms to the class interests of the peasantry.

Support to the countryside is a decisive guarantee for strengthening the worker-peasant alliance, ensuring the proportionate development of industry and agriculture, eliminating the distinctions between town and country and finally solving the socialist rural question.

The Democratic People's Republic of Korea actively aided the countryside from immediately after liberation. In particular, after the cooperative reorganization of agriculture and the laying of the basis of socialist industry, it strengthened its political guidance and material, labour, technical and financial support to the countryside in line with the policy set out in the great rural theses.

During only the past 17 years following the publication of the rural theses, a huge amount of state funds accounting for 19.7 per cent of the total state investments in capital construction was appropriated for rural construction. The figure will be still greater if the investments made in industries directly in the service of the rural economy are added.

The state rapidly developed the engineering, chemical and other industries which serve agriculture. In consequence, modern material and technical means such as tractors, lorries, farm machines and irrigation equipment were made available to the countryside and fertilizers, agricultural chemicals and building materials were mass-produced and supplied at cheap prices.

The state also trained and dispatched legions of technical and management personnel to the countryside. In order to introduce the achievements of the green revolution in production, it set up many state-run seed selection and livestock breeding farms and responsibly provided cooperative farms with all the fine seeds and breeds they need.

Material, technical and financial support of the state made it possible to consolidate and develop all cooperative farms rapidly while enhancing the leadership role of state property.

Social labour support to the countryside has been intensified, so that the whole nation turn out in giving a helping hand to the farmers in their busy seasons. Rural hard cores have been firmly built up by dispatching large numbers of young people including discharged soldiers and workers.

Following the line laid down in the rural theses, the state abolished agricultural tax in kind in 1966 and then took the epoch-making step to abolish all taxation. Thus, our countryside became tax-free for the first time in the world.

Besides, the state raised its purchasing prices for agricultural produce and lowered various fees and charges to steadily increase the farmers' income.

In this way, our cooperative farms which made a hard start with no farm machines and few work hands and draught cattle, were in a short span of time turned into rich farms with modern material foundations of production and cultural facilities, and all farmers enjoy independent, creative and happy lives.

3. Strengthening of the Guidance and Management of Agriculture and the Bonds between All-People Property and Cooperative Property

To improve the guidance and management of agriculture and to strengthen the organic ties between all-people property and cooperative property is very important for the solution of the rural question.

Without improving the guidance and management of agriculture and correctly settling the mutual relations between all-people property and cooperative property, it is impossible to speed up the ideological, technical and cultural revolutions in the countryside, effectively materialize the support of the working class to the countryside and successfully solve all problems of socialist rural construction.

Correct solution of the question of guidance and management of the socialist rural economy is an important condition for the final solution of the rural question. The system and method of state guidance are a matter of cardinal importance in improving guidance and management.

The basic direction of improving the guidance and management of socialist agriculture is towards bringing the management of farms closer to the level of the advanced industrial management, and the basic method of guidance and management of socialist agriculture is the industrial method of enterprise management which means strengthening the technical guidance of production and planning and organizing all management activities.

In order to guide agriculture by the industrial method, we set up county cooperative farm management committees, provincial rural economy committees and the Agricultural Commission in the centre.

In this well-organized new system of agricultural guidance, the county cooperative farm management committee plays the most important role. With technicians, specialists and state enterprises in the service of agriculture, under its control, this committee is a specialised organization for agricultural guidance which performs the function of directing the cooperative farms in the county.

The new system of agricultural guidance with the county cooperative farm management committee as its basis is showing great advantages in the guidance and management of agriculture. Its first advantage is that the old administrative method of agricultural guidance gave way and the industrial method of guidance has been established with the technical guidance of production as its key factor.

By mobilizing technicians and specialists in the county, the county cooperative farm management committee solves all technical and economic problems concerning agriculture on one hand and, on the other, runs the entire rural economy of the county in a uniform way according to a uniform plan drawn up in detail, exercising control over cooperative farms and such state-run enterprises under it as farm machine station, farm implement factory, land development office, irrigation control office, seed station, epizootic prevention centre and seed-egg farm.

The committee also delivers, through the material supplying agency, fertilizers, agricultural chemicals, herbicides, farm machines and implements, spare parts and other materials to the production sites under a plan in keeping with the production processes of the cooperative farms as required by the Taean work system.

With the guidance of the committee intensified through the industrial method, great progress is made in the management of cooperative farms.

Today all cooperative farms enlist, under the guidance and support of the management committee, the creative wisdom of their technical personnel and farmers in correctly applying the Juche farming method and do all farm work in a scientific and technical way.

They also implement the policy of unified and detailed planning; they draw up and execute scientific and exhaustive plans taking into account all factors of production and dovetailing them down to details, and correctly deal with complex problems such as of labour and financial administration and the maintenance of balance between accumulation and consumption.

Another conspicuous advantage of the new agricultural gu-

dance system is that the organic combination of all-people property and cooperative property is realized with credit through the strengthening of direct production ties between industry and agriculture.

To bring cooperative property gradually onto the level of all-people property is one of the important questions in the solution of the socialist rural question.

In order to solve the problem of ownership properly under socialism, we brought the advantages of the agricultural cooperative system into full play and, at the same time, organically linked the ownership of the whole people with cooperative ownership as the material and technical foundations of agriculture were consolidated and the technical, cultural and ideological levels of the peasantry rose. The most important thing here is that the two kinds of ownership were organically linked in the direction of strengthening the direct production ties between industry and agriculture and enhancing the leading role of the ownership of the entire people.

In this way, this problem is smoothly solved in our country without artificially separating the two kinds of ownership or hastily switching over to all-people property in disregard of the actual conditions.

Machines and equipment including tractors and lorries produced by the socialist state-run industry are not sold as commodities but delivered in the form of all-people property, through county cooperative farm management committees, to farm machine stations, land development offices and irrigation control offices which are at the service of cooperative farms. Farm machine stations and other state enterprises do farm work responsibly on cooperative farms with these machines and equipment. This further strengthens the production ties between industry and agriculture and increases the leading role of all-people property over cooperative property.

In our country, tractors and drivers from the farm machine station under state ownership are permanently allotted to workteams and sub-workteams of cooperative farms and assume responsibility for mechanizing the productive work of the farms.

Nearly all the fixed assets engaged in production on cooperative farms are state property.

With the vigorous promotion of the ideological, technical and cultural revolutions in the countryside after the establishment of the socialist system, the material and technical foundations of

agriculture were consolidated beyond measure and the ideological, cultural and technical levels of farmers raised remarkably.

As a result, the question of converting cooperative property into all-people property has now become an urgent task of our revolution. To carry out this task, we have set an experimental stage and are accumulating experience.

Drawing on the successes already achieved, we will push ahead more vigorously with socialist rural construction, so that we will successfully convert cooperative property into all-people property and build a classless society in the near future.

4. Enhanced Role of the County as the Regional Base

To select the regional base correctly is imperative for organizing and guiding rural work in a uniform and all-round way. This is due to the remnants of the old society—the technical, cultural and ideological lag of the countryside behind the towns, the complex composition of the peasantry, the natural and seasonal limitations of agriculture and, foremost, to the dispersed character of the rural areas.

In our country the county serves as the most suitable regional unit and base in respect to size and in that it is possessed of cadres, leading bodies, and material, technical and cultural means. The county is the lowest unit of Party and administrative guidance and the all-embracing unit of local economic and cultural development. It is the base for linking the towns with the countryside in all spheres of politics, economy and culture. Therefore, it serves as the base for accelerating the three revolutions in the countryside and for bringing support to the rural areas.

Therefore, only by enhancing the role of the county can we accelerate rural construction and, consequently, quicken the all-round development of the country.

We strove to enhance the role of the county as stipulated in the rural theses and have scored great successes.

With the enhancement of the role and militant functions of the county Party committee, the administration committee, cooperative farm management committee and other county organs are organizing work to carry out all decisions and directives of the Party and

the state correctly and coping responsibly with all work in the county.

Local industries in counties have come to play a greater role in developing agriculture and improving farmers' living standard.

Local industry factories in each county have more than doubled in numbers as compared with the time before the publication of the rural theses. At present each city and county has over 18 factories on an average, such as modernly-appointed foodstuff processing factory, daily necessities factory, garment factory, paper mill, furniture factory, refrigerating factory, etc. These factories purchase and process various agricultural and sideline products in season, produce and supply consumer goods to the rural population and help to lessen the household chores or rural women. These factories contribute greatly to propagating the advanced industrial methods of enterprise management, cultured ways of production and technology in the countryside and strengthening the politico-ideological influence of the working class on the peasantry.

Supply bases in counties have been built up solidly and commodity supply, public services and procurement work improved, and this strengthened the economic ties between town and country.

The county is also satisfactorily playing the role as the base of cultural revolution. The county seat has been built up well and its direct guidance and assistance to farm villages in education, culture and public health strengthened, so that the work of introducing urban culture to the countryside and establishing the socialist way of life in the rural areas is pushed ahead rapidly.

As you see, the role of counties as regional bases has risen and their work is going off well, with the result that success is being achieved in all state affairs.

All this success is a brilliant fruition of the great leader's wise guidance and rural theses.

The great leader, relying on the immortal Juche idea, has given correct ideological and theoretical expositions of all delicate and difficult problems arising in socialist rural construction, set forth concrete tasks for their solution and wisely led the struggle to carry out the tasks.

He always carefully looked after and showed deep love and solicitude for the state, economic and cultural institutions not to be biased or be negligent of any problem in implementing the rural theses.

This enabled us to move forward straight without the least

deviation, wavering or hesitation along the unfrodden path towards the solution of the socialist rural question.

Today our people are firmly convinced that the path shown in the great leader's unique rural theses is the right path towards the solution of the socialist rural question.

Pursuant to the magnificent long-range objectives of socialist economic construction for the 1980's set out by the great leader at the Sixth Congress of the Workers' Party of Korea a vigorous struggle is now going on in the Democratic People's Republic of Korea to hit the target of 15 million tons of grain production and to reclaim 300,000 *chongbo* of tideland.

In this decade, tractors will increase to 10-12 per 100 *chongbo* of cultivated land and 7 million tons of chemical fertilizers will be produced for the countryside annually.

In the near future comprehensive mechanization and chemicalization of agriculture will be completed and thus the task of industrializing agriculture set out in the rural theses will be accomplished.

According to the policy of intellectualizing the whole society, measures will be taken to introduce compulsory higher education. To this end, the work of existing regular universities will be improved and strengthened and, at the same time, many study-while-working farm colleges and agricultural colleges will be set up, and a college on TV started.

Cooperative property will be converted into all-people property through the experimental stage, and the leftovers of the old society—the distinctions between town and country and the class distinctions between the working class and the peasants will disappear.

Then the Democratic People's Republic of Korea will be turned into a classless society, a completely victorious socialist society never known to mankind before, and it will vigorously advance towards communist society where the people enjoy Chajusong to the full.

The Juche Farming Method Is the Most Advanced and Scientific Method Suited to the Actual Conditions of Our Country

To develop farming methods steadily in keeping with the actual conditions of each country is an important problem arising in increasing food and agricultural production.

The great leader President Kim Il Sung said:

"In order to increase the output of grain and other crops quickly, farming methods should be scientific and suit our climate, soil and crops, and agricultural production must be intensified by a full use of Juche-based farming methods." (Kim Il Sung, *Selected Works*, Eng. ed., Vol. VII, p. 447.)

Modern material and technical means require corresponding farming methods and the development of farming methods presupposes the use of various material and technical means.

The technical revolution was vigorously pushed forward in our countryside. As a result, the material and technical outfit of agriculture was improved and agriculture entered on a new stage where industrialization and modernization were the order of the day. This inevitably called for the introduction of highly intensive farming methods suited to it.

Improvement and development of farming methods came to the fore as an urgent demand to tide over the influence of the cold front that swept over the world and to advance agricultural production on a basis which can give high and stable yields.

It was impossible to develop agricultural production on a higher plane without inventing a novel method of farming which would always ensure stable yields under whatever adverse weather conditions.

With a scientific insight into such actual requirements, the great leader President Kim Il Sung generalized the historical experiences of agriculture in Korea and the world and created the new original Juche farming method.

1. The Juche Farming Method Created by the Great Leader President Kim Il Sung

In order quickly to boost farm production by actively introducing high-yielding farming methods, the great leader of our people President Kim Il Sung energetically guided agriculture from the first days of the building of a new society.

In particular, early in the 1970's when our agriculture entered on a new stage of development and a food crisis was sweeping across the world, the great leader set agriculture as one of the main fronts of socialist economic construction and personally guided it.

Every year the respected leader visited numerous farm villages across the country on his endless tour of on-the-spot guidance. He sat knee to knee with peasants to discuss farm work, analyzing and summing up farming experiences. He even built an experimental plot in the garden of his mansion and cultivated different crops and many varieties. He studied the farming methods of our country by seeing to it that experiments were made in different regions of the country. Moreover, studying the actual conditions and experience of agriculture in many other countries and foreseeing the trends of agricultural science and technology of modern times, he conceived and worked to perfect the Juche-based farming method.

This is how the novel Juche farming method came into being.

2. The Main Features of Juche Farming Method

The Juche farming method was created as an embodiment of the immortal Juche idea. This method makes it possible to do farming in a scientific and technical way in conformity with the climatic and soil conditions of the country and the biological features of crops and to make agricultural production highly intensive on the basis of modern science and technology.

The Juche farming method is grounded, above all, on the

fundamental principle of the Juche idea that man is the master of everything and decides everything.

The vital question in the theory of agricultural methods is: What is the viewpoint from which it proceeds? Only when the theory proceeds from a correct outlook on the world, can the agricultural methods be scientific to correctly understand and control nature and can fully discharge their mission as such.

The former theories of farming methods regarded soil and crops as the central factors and put the main stress on expounding the methods of tending them instead of approaching the question with man, the master of nature and society, as the central factor. Needless to say, it is impossible to reap a rich harvest unless land is fertilized and crops are cultivated well, so this undoubtedly occupies an important place in farming methods. But like all other things, farming is also done for the people and by the people. Without raising the decisive role of the people soil cannot be made rich nor good crops be raised. This is a truth illumined by the undying Juche idea and how this is approached will determine the practicability and scientific nature of a farming method.

The Juche farming method deals with all problems of agriculture according to the Juche viewpoint that man is the master of everything and is the most dignified being with an infinite power to master nature.

The Juche farming method does not seek after profits or gains but aims at reaping a high and stable harvest and guaranteeing the peasants an independent and creative life.

The main point of the Juche farming method lies in the very fact that this method makes it possible to control and purposefully use the objective laws of nature and the laws of growth of crops through the independent and creative activities of people and to make them serve the people to the full.

The Juche method of farming suits our country.

In general, the natural surroundings and conditions are one of the basic elements which exert an influence on farming methods. This is because farming methods imply scientific and technical processes which accelerate the proliferation of crops growing under the influence of natural environments including land. Therefore, farming methods must be consistent with the specific climatic and soil conditions of the given country. Only then can they be scientific methods which correctly reflect the objective realities.

The Juche farming method is opposed to flunkeyism and dogmatism, and throws light on the principles and methods of raising crops in keeping with the actual conditions of one's coun-

try from the strictly Juche-based viewpoint and stand to do farming well. First of all, it explains a method of farming aimed at a highly intensive use of land in our country where the arable land is limited. It also expounds a scientific and technical method of raising crops in keeping with the topographical features on the principle of the right crop on the right soil in the right time in our country which has a wide variation of natural and economic conditions.

Plant-by-plant and cluster-by-cluster tending, allocation of plots for crops and varieties on the principle of the right crop on the right soil and in the right time, raising and transplanting seedlings in good time, a scientific manuring system, water control and all other contents of the Juche farming method are original and suited to the actual conditions of our country.

Further, the Juche farming method is the most advanced method of farming.

Whether a farming method is advanced or not is decided by how much the Chajusong of the farmers is realized in farm work.

The Chajusong of farmers is achieved through the process of their complete emancipation from the restrictions of nature and arduous labour, to say nothing of the fetters of the old production relations.

The Juche farming method makes agricultural production highly intensive and emancipates the farmers from the restrictions of nature and heavy labour, thereby actually guaranteeing their Chajusong in farming.

First of all, this method invariably ensures a high and stable harvest in whatever adverse natural conditions through a highly intensive farming.

In most of the farming methods so far known in the world land is left out of crop by way of crop rotation or fallowing, and even in the case of intensive farming land utilization is not very high.

In some countries some of farms are worked in a highly intensive manner because of unreasonable production structure, and in other places land is continuously laid waste due to the ruin of the peasant economy.

No matter how intensive, farming cannot be considered to be advanced so long as backbreaking hired labour is used and agricultural production is not free from the restrictions of nature.

But in the Juche farming method agricultural production is highly intensive due to plant-by-plant tending.

The great leader President Kim Il Sung said that intensive agriculture means plant-by-plant farming.

In the plant-by-plant farming which constitutes the basic content of the Juche farming method, crops are planted closer two times or more than before per *pyong* on the basis of the achievements of the green revolution and the development of cultivation techniques. At the same time, various intensive farming techniques are applied to constantly increase land fertility to suit close planting, water the fields and tend crops carefully plant by plant. This helps to increase the surface areas of roots and leaves of the crops per unit area to absorb soil nutriments and light to the maximum and thus yield good harvests.

The original Juche-based farming methods include new ways of catch cropping, plant allocation, gradational cultivation of vegetables and double-cropping, which not only increase land utilization considerably but make it possible to use the space of land in a three-dimensional way.

At the same time, the Juche farming method frees the peasants from heavy labour and makes their labour easier and more efficient.

Machines, electricity, chemical and many other modern material and technical means are used in the highly intensive agricultural production.

In our countryside where the Juche farming method is employed, 1.6 tons of chemical fertilizers is applied per *chongbo* of fields on an average and 97 per cent of the paddies is weeded by chemicals. And different kinds of agricultural chemicals and growth regulators are widely used. The number of tractors per 100 *chongbo* of arable land stands at 7 in plain areas and 6 in intermediate and mountainous areas. All farm work is done by tractors and various other farm machines. Water pumping, thrashing and many other stationary jobs are carried out by electricity. As a consequence, the farmers are working with ease and efficiently.

In this way the Juche farming method makes agricultural production highly intensive, and this makes for the realization of Chajusong of the peasants in farming.

Further, the Juche farming method is the most scientific method.

The scientific character of a farming method is determined by how purposefully the laws of nature and crop growth are understood and used in farm work.

If we master the nature of crops and meet their biological requirements in conformity with the laws of nature and crop

growth, their productivity will rise continuously and fine harvests will be yielded.

The Juche farming method shows scientific ways of purposefully using and controlling the objective laws of nature and crop growth on the basis of the achievements of modern agrobiological researches.

According to the biochemical analysis of crops and the overall analysis of their growth environments, the Juche farming method defines basic elements of fertilizer not as three—nitrogen, phosphorus and potassium—as before, but as four including silicon. And the Juche farming method indicates a new way of fertilizing, according to which the four-element fertilizers and various kinds of microelement fertilizers should be properly mixed and applied in many instalments in conformity with the soil conditions and the nutritional, physiological needs of crops. And the composition and quantity of fertilizers, the time and methods of their application are defined in a scientific way so that the damage of abnormal weather can be overcome and the growth of crops be facilitated.

The production of new superior seeds, cultivation and transplantation of seedlings, growth regulation of crops, prevention of damage by blight and harmful insects, water control and other contents of the Juche farming method are fully guaranteed on a high scientific and technical basis.

3. The Great Vitality of the Juche Farming Method

The Juche farming method has brought about a great turn in our farm production.

The great leader President Kim Il Sung said:

“The peasants came to do away with empiricism and conservatism and do farming by the Juche farming method, a new scientific farming method. It can be said that this is a great revolution in agriculture.” (*On the Problems of Socialist Economic Management*, Korean ed., Vol. 4, p. 384.)

It is generally regarded as the rule that the tempo of growth in agricultural production is slower than in industry because the area of land is limited, farming is largely influenced by natural conditions and living things with a rather long production period have to be handled in it.

However, this old conception and theory has been upset in our agriculture, which is developing at a great speed every year.

The World Food Conference held in 1974 in connection with the acute food situation of the world discussed the question of increasing the annual rate of growth of food production by an average of 4 per cent. But the developing countries still have to go a long way to reach that goal.

In the period following 1972 marked by the aggravated food situation in the world, our grain output increased at a high tempo every year.

Here is a diagram showing the growth of grain output in our country in comparison with 1944, a year of Japanese imperialist colonial rule.

	Grain output (tons)	Percentage
1944	2,167,163	100
1949	2,790,000	129
1960	3,803,000	176
1974	7,000,000	323
1980	9,000,000	415

During the recent 20 years the per-hectare grain output of the world has shown an increase of only 500 kilogrammes on an average. But in our country it has grown sharply.

The following diagram shows the growth of per-*chongbo* output of rice and maize, major cereal crops in our country.

	Rice (kg)	Maize (kg)
1944	2,516	723
1949	3,031	1,331
1974	5,900	5,000
1980	7,200	6,300

In the past our country only produced 2 or 3 tons of rice per *chongbo*, and 4 tons at best and 1.5-2 tons of maize but at present

the figures are 7.2 tons for rice and 6.3 tons for maize. Many farms in the plain areas gather in 8-9 tons or more.

Along with grain output, the production of vegetables and industrial crops including tobacco has increased rapidly.

Our country whose natural and economic conditions are very unfavourable and which took over backward agriculture from imperialist colonial rule, is now standing abreast with the developed nations of the world in agricultural production.

The Juche farming method has thus developed agricultural production safely, continuously and rapidly, fully satisfying the demands of the people for grain and other agricultural produce. This provides a sure material guarantee for national independence and political Chajusong.

This miraculous success in our agricultural production is due entirely to the wise guidance of the great leader of our people President Kim Il Sung and the glorious Party centre and is a brilliant fruit of the Juche farming method initiated by the great leader.

Land Resources and Its Rational Use in the Democratic People's Republic of Korea

Land is the basic means of agricultural production and constitutes a valuable asset of the country.

Rational exploitation and utilization of land resources is necessary more than anything else to strengthen national independence and provide a happy life to the people through the solution of the food and agricultural problems.

The great leader Comrade Kim Il Sung said:

"We have no other land than our 3,000 ri. We must turn this land to better account by administering and improving it properly. If we make the best use of our land, the entire Korean people can lead as affluent a life as we wish." (Kim Il Sung, *Selected Works*, Eng. ed., Vol. III, p. 275.)

The great leader Comrade Kim Il Sung's teaching throws light on our Government's position on providing a good life to our people through effective exploitation and utilization of the land resources of the country on the principle of self-reliance.

1. Land Resources in the Democratic People's Republic of Korea

The northern half of our country has two million *chongbo* of arable land, which is no more than 15 per cent of the territory. Mountains account for nearly 80 per cent of it.

Arable land, except orchards, mulberry fields and the like, is 1,600,000 *chongbo* in all, of which paddy fields occupy 650,000 *chongbo* and non-paddy fields, 950,000 *chongbo*. This is a very small area, with less than 0.1 *chongbo* going round per capita.

In pursuance of the wise policy set forth by the great leader President Kim Il Sung, state-run crop and stock farms were set up and cooperative reorganization was carried out along social-

ist lines in a short span of time after the war. This resulted in the establishment of socialist relations of landownership in our country.

In our country land is now placed under state and cooperative ownership, and the land under cooperative ownership is predominant.

Establishment of socialist landownership eventually removed all sources of exploitation and poverty which ravaged our rural areas for thousands of years and turned them into a socialist countryside where farmers work collectively and lead a free and happy life.

In April 1977 the great leader President Kim Il Sung promulgated the land law, a new land development programme aimed at legally consolidating all the successes gained in settling the land problem.

The land law stipulates the relations of landownership in our country and matters pertaining to the development, conservation, management and use of land which are to be effected according to the general plan for land development.

It provides a legal guarantee for rational use of land in our country.

2. Intensive Utilization of Arable Land

Intensive use of existing farmlands is most important in developing and using land.

The great leader President Kim Il Sung said that there is no bad land for a diligent farmer. Putting up the slogan "Don't let an inch of land lie idle!" right after liberation, he wisely led our people to take as good care of the crop fields as flower gardens.

Under his wise leadership we used our best efforts to raise the fertility of land. We have carried out soil analysis several times throughout the country and drew up tables of soil analysis for all plots. On this basis, land is improved and various kinds of chemical fertilizers are applied in proper combination under a scientific manuring system to meet the specific conditions of the soil.

Fields are ploughed deep and plenty of organic fertilizers applied. Green manure crops are planted in dry fields as the

second crop after harvesting grain crops. Then the fields are up-turned deeply.

All acidified lands have been improved mainly by spreading large quantities of slaked lime and slag. Damage by cold and dampness has been prevented by thoroughly establishing a drainage system in the cold and damp fields.

According to the nature-remaking policy we have dynamically pushed ahead with land development to raise the fertility of land and make effective use of it.

Large irrigation projects and a number of medium and small irrigation projects were carried out long ago in a mass movement. Recently active steps have been taken to use underground water for irrigation, such as digging wells and ponds and driving in pointed pieces of pipes everywhere.

Great effort has been expended on the projects of drawing off standing water. As a result, drainage pumping stations and ditches have been built wherever water could stagnate. This has made it possible to prevent damage by standing water.

Our land is mountainous and sharply declined and rain falls in torrents in summer. So, sturdy embankments were built on all rivers and on the coasts and afforestation work was widely carried out. In consequence, the fields are completely safe against natural calamities.

Thus, our farmlands always provide a sure guarantee for high, stable yields in any drought and rainy season.

We are carrying out land rezoning and terracing to introduce comprehensive mechanization in all fields.

Our country is mountainous and has a great many hillside fields and tiny plots of paddies and non-paddies which are the residue of private farming in the past.

We are removing useless ridges between fields and readjusting all fields to make the plots large and regular-shaped.

Besides, we readjusted strips along railways, highways and waterways, filled up pools and moved houses scattered in the fields to the foot of mountains.

We are energetically launching a campaign to terrace hillside fields with over 16 degrees' gradient in a mass movement.

County land development offices have been set up under the county cooperative farm management committees to carry out land development successfully.

Further, we are increasing the utilization of land to the maximum by improving farming methods.

We have increased the area under high-yielding crops by

improving distribution of crop areas on the principle of the right crop on the right soil.

We attach special importance to plant-by-plant or cluster-by-cluster farming to raise land utilization.

High-yielding and low-stature varieties are grown with the progress of the green revolution, and chemical fertilizer, agricultural chemicals including weed killers, farm machines and various other material and technical means are widely used. As a result, about twice as much or more plants are planted per *pyong* of crop area as before.

Plant-by-plant or cluster-by-cluster farming method which means increasing the number of plants or clusters and tending each of them well to produce a full yield, contributes greatly to increasing the yields.

In our country the land space is utilized both horizontally and cubically through the adoption of a new catch cropping method by which crops of low- and high-statures are grown together. Ridges between and edges of fields, riverside strips and all idle lands are planted with crops.

Although our country has a short farming season, two-crop farming is done through introducing early-ripening and high-yielding varieties to make the best use of the land.

3. Land Reclamation

In order to increase food and agricultural production steadily it is necessary to extend crop area.

This poses a serious problem for countries like ours which have very small per-capita crop area.

Korea has extensive tideland along the west and south coasts. The west coast of the northern half of the Republic alone has reclaimable tideland far exceeding 300,000 *chongbo*.

We have already reclaimed tens of thousand *chongbo* of tideland by energetically pushing ahead with reclamation projects according to the bold tideland development plan.

In conformity with the grand programme of socialist economic construction set out by the great leader President Kim Il Sung at the historic Sixth Congress of the Workers' Party of Korea, we are now conducting a vigorous campaign to reclaim 300,000

chongbo of tideland along the west coast by the end of the 1980's.

Besides, a mass campaign has been launched to acquire 200,000 *chongbo* of new land through land rezoning and reclamation of hills.

4. Rational Exploitation of Mountains for Agriculture

It is of great importance to make good use of mountains in our mountainous country.

The great leader President Kim Il Sung advanced the policy of exploiting mountains well in mountainous areas and making good use of the sea in the coastal areas.

In the past the imperialists devastated our mountains by robbing them of timber.

Today, however, we have extensively planted useful trees on the mountains and improved the composition of forests. In this way we are increasing the assets of the country and making effective use of them for agriculture.

Upholding the policy the great leader President Kim Il Sung set forth at the historic enlarged meeting of the Presidium of the Central Committee of the Party held in Pukchong in 1961, our people extensively planted orchards on hills across the country, bringing their area to 300,000 *chongbo*. These orchards thriving with fruits of all kinds are a brilliant fruition of our people's efforts and a valuable asset to be handed down to posterity.

Besides, we are developing stockbreeding by using pastures on hills and natural feed for raising sheep, cows, rabbits and other grass-eating domestic animals. We also keep bees on a wide scale.

Following the Party's policy of extensively creating forests of economic value, oil-bearing trees, trees for fibre and pulp-wood and other trees of economic value have been planted on all hills of the country. Edible and medicinal herbs, wild fruit trees and oil-bearing plants are actively protected and multiplied and collected for effective use.

In pursuance of our Party's policy we are striving to create two million *chongbo* of forest in the near future.

5. Improvement of Land Administration

Conservation and administration of land, a valuable asset of the country, are of special importance.

The state draws up a land development plan and, on this basis, exploits and uses it in a rational way.

Conservation and administration of land should be the common concern of the whole country and the entire people.

There are strict regulations concerning the use of land in our country. Such irregularities as building houses and factories on cultivated land without the permission of the state and encroaching upon forests are prohibited by law.

We are strengthening the education of the people in the spirit of taking good care of land.

Our land is a valuable national asset for both the well-being of the present generation and the prosperity of the generations to come.

The Government of the Republic strengthens the education of the working people in socialist patriotism, so that they make every tiny plot of land fertile without encroaching upon it or losing it, and exert all their efforts to make proper use of the land resources of the country.

Thanks to the wise leadership of the great leader and the glorious Party centre, great success has been achieved in food and agricultural production through the rational use of land resources in our country.

In the future too, we will strive to solve food and agricultural problems successfully through more rational use of land resources of the country.

Irrigation Is the Decisive Guarantee for Increasing Food and Agricultural Production

In general socio-economic development depends largely on the exploitation and utilization of water resources.

The question of exploitation and utilization of water resources is particularly important in agricultural production.

Only when the irrigation system is properly established through active development of water resources, is it possible to make effective use of land resources for stable farming and always ensure high yields.

In view of the long whimsical weather owing to the influence of the cold front, the active tapping and utilization of water resources is now more urgently needed.

The irrigated area throughout the world is 200 million *chongbo* or 15 per cent of the total area under cultivation, that is, 1,320 million *chongbo*.

The imperialists and colonialists plundered developing countries of their inexhaustible natural resources for a long time, but established no irrigation system to speak of.

So, in developing countries the irrigated area accounts for only 21.7 per cent of their total arable land and only 3-4 per cent in some countries, though they have 96.4 per cent of the world rice paddies.

In many regions, owing to the lack of rational use of water resources and the damage of drought, grain output per *chongbo* remains at 1-2 tons and animal husbandry is also seriously suffering.

In other regions, flood damage threatens agricultural production because there is no proper water conservancy.

Therefore, it is most urgently needed to firmly establish the irrigation system through proper exploitation and utilization of water resources in the developing countries in order to increase agricultural production and attain self-sufficiency in food.

1. Irrigation Is the Priority Task of the Rural Technical Revolution

In view of the importance of exploitation and utilization of water resources in agricultural production and development of the national economy, irrigation was set as the task of top priority for the rural technical revolution and great emphasis was put on it, with the result that in our country the historic task of irrigation was accomplished splendidly long ago.

The great leader Comrade Kim Il Sung said:

"Our Party set irrigation, electrification, mechanization and chemicalization as the basic contents of the rural technical revolution and advanced the policy of giving priority to irrigation." (Kim Il Sung, *Selected Works*, Korean ed., Vol. VIII, pp. 105-06.)

The need for giving priority to irrigation derives, first of all, from the fact that unlike industry, agriculture is largely subject to the influence of the natural and climatic conditions. Without water, it is impossible to grow crops, living organisms, and ensure production. Therefore, water is literally life-giving in agriculture.

The need for giving priority to irrigation is more keenly felt in view of the peculiarities of the conditions for agricultural production in our country where rice cultivation holds a big proportion and we have dry weather in spring and heavy rain in summer.

Paddy farming requires several times more water than dry-field farming. Dry weather in spring prevents proper sowing and heavy rain in summer may cause severe damage to crops. If crops are affected by flood and drought, neither electrification nor mechanization, nor chemicalization, the components of rural technical revolution, can prove their true worth. It is therefore of vital significance in developing agricultural production to give priority to irrigation.

Our country, like other developing countries, had taken over backward economy and culture from imperialist colonial rule. It, therefore, required some time to industrialize the country to such an extent that it could equip the rural economy with modern machines and technology. But we could not leave the backward agriculture alone until the country was industrialized.

Irrigation can be undertaken even before the country's

industrialization is accomplished, if the state intends to do. Our people had valuable experiences in irrigation from remote antiquity. At that time they had no modern industry, but made reservoirs by building up dams with stones and earth, dug waterways and set up irrigation structures for rice cultivation.

On the basis of a profound analysis of the urgent social and economic demands and feasibility, the great leader Comrade Kim Il Sung paid deep attention to irrigation and wisely organized and led this work from the first days of building a new society after liberation.

The great leader Comrade Kim Il Sung, with a view to materializing his far-reaching plan for remaking the nature of the country, proposed the Potong River improvement work and personally came out to the construction site to take up the first spade for irrigation works already in May 1946, immediately after liberation. Since then our people have waged an energetic struggle for nature-remodelling, afire with an unquenchable revolutionary enthusiasm, building up river embankments, constructing reservoirs everywhere in the country and planting trees on mountains.

The US imperialists committed bestial crimes of showering bombs and indiscriminately destroying the dams of reservoirs and river embankments built by our people at the cost of their precious labour and mass heroism in the outset of building a new society. However, elated by their victory in the war against the US imperialists, our people not only rebuilt them quickly but also undertook ever more and larger irrigation projects.

Following the successful completion of agricultural cooperativization, the great leader convened the plenary meeting of the Central Committee of the Workers' Party of Korea in September 1958 to arouse the whole Party and entire people to the one million *chongbo* irrigation works.

In particular, he published the immortal classic *Theses on the Socialist Rural Question in Our Country* in which he threw light upon the orientation and ways of the rural technical revolution, and wisely organized and led the irrigation works to be undertaken on an ever larger scale and on the modern basis in keeping with the active promotion of the industrialization of the country. As a result, the historic task of irrigation with watering and drainage systems was completed with credit in our country already during the Seven-Year Plan.

2. Establishment of Irrigation System

What is most important in irrigation is to establish an irrigation system in paddy and dry fields. Only when this is done is it possible to water crops properly and in good time and prevent drought damage.

Before liberation, however, our country had poor irrigation systems. Then the area under irrigation was only 100,000 *chongbo*, and most paddy fields were poorly irrigated. Peasants depended on rain for farming and a great many people died from hunger due to drought.

After liberation, therefore, the establishment of a good irrigation system and solution of water problem were the most urgent demand. Thus, we concentrated great efforts on irrigation works and, with the realization of cooperativization, stepped up these works in a movement involving the whole nation and entire people.

With main emphasis on the irrigation of paddy fields, we introduced dry field irrigation and extensively established an irrigation system in the plain and all other areas. This was because only when all paddy and dry fields were watered well enough could the food and agricultural production be rapidly increased in all areas of the country.

In establishing irrigation system we also linked up major irrigation systems which were contiguous to one another to set up a large-scale rotational irrigation system. This is a perfect irrigation system to make most effective use of irrigation water by supplying water to one another.

We held fast to the principle of combining medium- and small-scale irrigation works with large-scale ones. The specialized state irrigation construction stations directly undertook large-scale irrigation works since these required not only high level of techniques but also tremendous investments of materials, equipment and funds. Medium- and small-scale irrigation works were, however, pushed forward with the active mobilization of materials and labour force from localities and cooperative farms themselves.

The state, of course, supplied funds and some materials and equipment to the medium and small irrigation projects which were done by localities by themselves. The combination of large

irrigation projects with medium and small ones is an important way to speed up irrigation works at a more rapid pace by mobilizing local reserves and possibilities.

To establish irrigation system is a far-sighted worthwhile work for the state, society and people. Besides, it is a gigantic nature-remaking work. Accordingly, we carried out the grand nature-remaking project of setting up irrigation systems through a mass movement of the entire people with the powerful assistance from the state. Large and small irrigation works were dynamically pushed forward everywhere in the country by bringing into play the strength and wisdom of the entire people, with the result that already long ago a developed irrigation system was set up firmly in our country.

Today there are more than 1,500 reservoirs with a pondage of 298,000 *chongmi*. Among them are many big artificial lakes which were made by damming up ravines including Lake Yonpung and Lake Taesong, each with a pondage of 10,000-40,000 *chongmi*.

In our country there is a developed, ramified irrigation system based on water pumping, in addition to the irrigation system by reservoirs.

In different places of our country there are over 23,700 pumping stations, most of which are power-driven. Pumps are used either to draw up water from rivers and low channels to water paddy and dry fields or to lift the waste water of drainage ditches again for irrigation. Pumps are also used to fill big reservoirs or to water uplands several hundred metres high through up to five stages of pumping stations.

The total length of waterways stretching from reservoirs and pumping stations to the paddy and dry fields across mountains and through tunnels exceeds 40,000 km.

In addition, more than 94,700 wells and over 14,400 pools have been dug and 15,700 pipes driven in through an energetic struggle for using underground water in our country.

A modern water sprinkling system has been widely introduced in all vegetable gardens around cities and double-cropping fields. Our country now has 1.2 million *chongbo* of irrigated land, which accounts for 75 per cent of the total area under cultivation, 1.6 million *chongbo*. Thus nearly all fields, except those on steep slopes in the mountain areas, are now under an excellent irrigation system.

The completion of irrigation has made it possible to use water more efficiently and comprehensively for the development of the

national economy of our country. Along with reservoirs, large and small hydroelectric power stations have been built extensively and the task of rural electrification completed splendidly. And water transport and fresh-water fish breeding are further developed through the use of reservoirs and rivers. Most reservoirs have been arranged as recreation centres for the working people and many rest homes and sanatoria constructed there for them.

3. Establishment of Drainage System and Forestry and Water Conservancy

The establishment of drainage system and forestry and water conservancy is an important component of irrigation works.

Because our land is very much accidented, water flows into low places and lays many fields submerged. In particular, our country has 50-60 per cent of its annual precipitation in July and August, with occasional torrential rains of more than 200 mm a day in this season because of the abnormal weather. Therefore, the failure in establishing the proper drainage system and in forestry and water conservancy may cause irretrievably grave consequences not only to agricultural production but to different branches of the national economy.

In order to set up the drainage system large numbers of drainage pumping stations have been built in the low areas where water converges.

At present the drainage pumping stations constructed and operated in our rice-producing areas number 1,340. They are equipped with a required number of big water-pumps capable of draining off 0.9-1.2 cubic metres of water a second. If rains or stagnant waste water threaten the growth of rice, they are operated to drain away useless water to rivers or sea.

It is also important to dig contoured ditches and drainage channels in establishing the drainage system. Contoured ditches are dug around hillsides along contour lines so as to prevent the fields from being flooded by the rainwater streaming down the mountain slopes. Drainage ditches are dug along the low places in order to allow useless water to flow down by itself. The total extension of drainage ditches in our country is more than 1,460 km.

Drainage ditches are in many cases connected with drainage

pumping stations or drainage lock gates at their ends. A thorough culvert drainage system has been set up in the cold and damp fields of our country to prevent the crops from damage by moisture.

There are many crop fields including those in the low areas at the foot of mountains which can suffer from moisture damage because of the rising water level in case of rain. We set up a culvert system in such fields with stones or bush woods, thereby raising per-unit-area crop yields 2-3 times.

Thorough forestry and water conservancy should be undertaken to prevent flood damage. Forestry and water conservancy holds an important place in the nature-remaking projects for irrigation.

For success in forestry and water conservancy priority should be given to extensively planting trees on all mountains near rivers and reservoirs. If mountains are left bare, there would occur landslips or scores of cubic metres of earth per *chongbo* would be washed down in a year, which would bring about the serious consequence of filling up rivers and reservoirs. In the past, the foreign imperialists plundered our country of its forest resources at random.

Therefore our country defined afforestation as an important policy for land development and aroused the Children's Union members and entire people to the energetic movement to plant trees every spring.

As a result, luxurious forests for preserving water resources have been created around all reservoirs and lakes and all mountains covered with trees on the whole. This adds beauty to the country's landscape and has created favourable conditions for forestry and water conservancy.

Further, good forestry and water conservancy requires building strong river embankments and tide-water control dikes. In our country, all river and tide embankments have been further reinforced so as to ward off flood damage from any torrential rains. The embankments along big rivers including the Chongchon are built up by the specialized state river improvement enterprises and the rest in an all-people movement, included in the local construction plan.

When river beds rise, they are dug by dredgers and excavators. Not only that, large dams have been erected along such big rivers as the Amnok and the Taedong to build hydroelectric power stations or lock gates, so that the river water is properly controlled.

Many facilities and structures are installed on the rivers to use water for irrigation. As a result, our country, once frequented by calamities from floods or tide-waters, is now able to prevent flood damage thoroughly.

4. The Creation of the Material and Technical Foundations of Irrigation

In order to push ahead successfully with the grand nature-remodelling work like irrigation projects it is necessary to lay the firm material and technical foundations for it.

Small- and medium-scale irrigation and river projects can be successfully pushed forward by tapping local materials and relying on the strength of the masses, but the construction of large-scale irrigation facilities requires enormous materials, machinery and equipment.

Proper realization of irrigation in the country needs not only clay, sand and pebble but large quantities of cement, steel, timber, vinyl pipes; it also requires pumping machines, electric motors and transformers, as well as large numbers of building machines including surveying instruments, bulldozers, excavators, cableways, conveyers, and lorries.

In implementing the basic line of socialist economic construction on giving priority to the development of heavy industry while simultaneously developing light industry and agriculture, we firmly built heavy industry not for its own sake but for the sake of light industry and agriculture.

Thus, our heavy industry sufficiently produced and supplied various materials, machinery and equipment needed for the rural technical revolution and, above all, for irrigation projects. At the same time, the construction of irrigation facilities can be successful only when precedence is given to the adequate surveying work and scientific technical designing and powerful building forces are prepared.

This is why our country has firmly built up powerful land designing forces that plan the comprehensive survey of land and its rational utilization, and the irrigation and river designing institutions that are specialized in surveying and designing irrigation projects.

The construction plans worked out by these designing institu-

tions after conducting sufficient investigations in mutual contacts are always subject to the examination of the specialized state design-inspection institution. Besides, state enterprises specializing in irrigation and river construction have been firmly built up in the capital and in every province, city and county.

After the completion of all irrigation facilities, it is important to operate them on a scientific and technical basis, maintaining and repairing them regularly.

In our country the management and operation of large-scale irrigation systems are in charge of the regional irrigation control offices, while the county irrigation control offices are responsible for small and medium ones to the state.

Cooperative farms, too, have the technical guidance system under which they manage and operate responsibly small- and medium-scale irrigation facilities in their respective areas; workteams and sub-workteams of the cooperative farm have their own water controllers and pumping machine operators.

Irrigation control offices are responsible for maintaining and controlling all the irrigation facilities including reservoirs, pumping stations and embankments: in farming season they establish a system of command for water supply and supply water in a planned and rational way by regions, plots and water sources under the technical guidance of the agricultural guidance organ, and in rainy season operate drainage pumping stations in time.

Irrigation control offices continuously improve the level of technique and skills of those who are engaged in water control and conduct irrigation and drainage work on a scientific line to suit the characteristics of crops and soil conditions and educate all farming people to economize even a drop of water, take good care of and control irrigation facilities and repair them in good time.

Besides, irrigation control offices exercise thoroughgoing supervision and control so that reservoirs, rivers and canals are not contaminated by noxious matters that may either do harm to crops and fishes or destroy structures, and actively protect the beautiful nature of our country.

In order to ensure successful afforestation work, forest management offices set up tree nurseries everywhere to produce and supply extensively fast-growing varieties of saplings which are of economic value, and give technical guidance and help to cooperative farms in growing young trees.

Our country trains large numbers of technicians and specialists in hydro-meteorology and irrigation at universities, hydraulic

university and agricultural universities in provinces, and builds up firmly scientific research institutions in the field of irrigation to solve scientific and technical problems concerning irrigation in good time.

Thanks to such measures taken by the state, it was possible for our country to complete successfully the tremendous nature-remodelling work like irrigation projects on its own in a short span of time.

A vigorous struggle is now going on in our country to further consolidate the successes already achieved in irrigation. We are working hard to solve the problem of water supply to the 300,000 *chongbo* of tideland now being reclaimed in accordance with the grand programme of socialist economic construction for the 1980's.

And we are pushing ahead with the work of introducing an irrigation system even in the hillside fields, while promoting in a far-sighted way the huge-scale work of afforesting two million *chongbo*.

At the same time an energetic struggle is also being waged to further readjust and reinforce and better control existing irrigation systems so as to make them prove more effective.

All these achievements made in irrigation provide firm assurance for the uninterrupted development of food and agricultural production and a material guarantee for the independent and happy life of the people.

Splendid Completion of Rural Electrification in the Democratic People's Republic of Korea

In the Democratic People's Republic of Korea electrification was defined as an important task of the technical revolution in the rural areas and was energetically pushed forward and brought to successful completion.

In our country electricity has been installed in all villages and dwelling houses both in plain areas and mountain regions and is widely used for farming operations.

The completion of electrification is one of the most important achievements made by the Korean people in the building of a new society; it is an essential factor contributing to the rapid growth of agricultural production.

1. Rural Electrification Is an Important Factor of Agricultural Development

Rural electrification is one of the most essential tasks in building a new society.

The respected leader Comrade Kim Il Sung said: "Electrification plays an important role in the technical and cultural revolutions in the countryside. Without the electrification of the rural areas, irrigation and mechanization cannot be successfully carried out, nor can modern rural construction be expected." (Kim Il Sung, *Selected Works*, Eng. ed., Vol. IV, p. 50.)

Electrification of the rural areas means widely using electric power in agricultural production and in the farmers' life so that they can work easily and efficiently and enjoy a civilized life.

Rural electrification is indispensable above all for the consolidation of the material and technical foundations of the rural

economy through the promotion of the technical revolution in the countryside.

Electricity is the largest motive power in modern production.

Only when the rural areas are electrified can the irrigation of agriculture be realized by properly doing such work as watering and draining. And also the stationary jobs such as thrashing and the pulverizing and processing of fodder can be mechanized and agriculture be modernized and put on a scientific basis.

Irrigation and mechanization may of course be ensured by other motive power than electricity. However, electricity has incomparably great technical and economic advantages over other motive power in the technical revolution in the countryside. With the progress of rural construction it assumes still greater significance.

Electrification is also an important way to build a modern countryside.

Electrification makes it possible to quickly spread the technical civilization of towns to farm villages, eliminate the cultural backwardness of the countryside and provide ample conditions for the study and cultural life of the farmers.

2. Struggle for Electrification in the Countryside

Deeply realizing the importance of electricity in eliminating the ideological, technical and cultural backwardness of the countryside, the great leader Comrade Kim Il Sung energetically pushed ahead with electrification in the rural areas from the first days of the building of a new society.

In order to accelerate electrification, measures were taken first of all to nationalize the power plants and electric facilities which had been monopolized by the foreign imperialists, in the early period of construction of a new society in our country.

In the past the Japanese imperialist aggressors who had occupied our country built some electric power facilities with a view to plundering its abundant resources, but scarcely used them for its agricultural development.

Before liberation the rural inhabitants accounted for the overwhelming majority of the entire population in our country, but the number of farmhouses with electric lights only stood at 150,000.

Moreover, there were few instances of electric power being used for farm work.

In such conditions the nationalization of all power facilities and their effective use were of importance in creating socio-economic conditions for farm electrification.

Our workers and peasants waged a vigorous struggle for increased production of electricity in all parts of the country in order quickly to rehabilitate and readjust the power facilities which were now the property of the people and to hasten the electrification of the country. They laid new transmission lines across the countryside in their vigorous efforts for rural electrification.

As a result, at the end of 1948 the number of farmhouses using electric power in farm work increased to 396 per cent compared with September 1945 immediately after liberation.

Installation of electricity in wide areas of the countryside where people had hardly used oil lamps let alone electric lights in the past was a great success in the electrification of the rural areas.

The electrification of agriculture in our country was more powerfully pushed forward in the period after a historic victory in the war against the US imperialist armed aggression.

In the postwar period our country was confronted with an important task to transform agriculture along socialist lines and carry out the technical revolution in the countryside so as to rehabilitate rapidly the rural economy severely destroyed by the war and stabilize and improve the peasants' ruined livelihood.

The great leader Comrade Kim Il Sung defined electrification as one of the important components of the rural technical revolution together with irrigation, mechanization and chemicalization and wisely organized and led the struggle for the electrification of all the rural areas.

For the acceleration of electrification of agriculture large power plants were built energetically by priority and, at the same time, many medium and small power stations constructed in all parts of the country.

The construction of many medium and small power stations made it possible to speed up the electrification of agriculture with a less outlay of funds.

The electrification of agriculture, unlike the installation of electricity in a few towns and factories, is a very difficult and vast undertaking for the introduction of electricity in farm villages and places of farming operations scattered throughout the country.

If these scattered places are electrified by a small number of power plants alone, it will cost enormous funds and a long time.

Building many medium and small power stations has great advantages in using the electricity generated by large power plants concentrically for industrial construction to accelerate the country's industrialization and push forward economic construction as a whole.

In our country the electrical machine industry base was consolidated before anything else in order to build many medium and small power stations.

Only by producing and supplying large quantities of electrical equipment and materials can we construct many power stations through a vigorous mass movement and push forward electrification rapidly in the countryside.

In our country the electrical machine factories built on our own in the initial stage of the building of a new society were rapidly reconstructed and expanded, meanwhile many electrical equipment factories built anew.

As a result, during the period from September 1958 to June 1959 when a large number of medium and small power stations were built, our workers tapped and mobilized all and every reserve and manufactured and sent to the countryside large quantities of electrical equipment and materials including over 2,500 electric motors and over 2,700 transformers. And all people turned out and collected scraps of copper and the copper mines increased production for the energetic acceleration of electrification.

Our farmers, while engaged in busy farm work, dammed up medium and small rivers and built medium and small hydropower stations in different places, and constructed wind power plants on windy heights.

In our country the waters of reservoirs for irrigation are also used for power generation before flowing into the fields.

As a result of the mobilization of all people for building medium and small power stations by various methods, hundreds of such power stations were built anew in less than one year after September 1958.

Bringing together in designated places the scattered dwelling houses in mountainous farming districts was another important step taken by the state for rural electrification.

In order to complete electrification in the countryside it is essential to make all farm villages and farmhouses in plain and mountain areas enjoy the benefits of electricity.

If electrification is to be completed while leaving the widely scattered houses where they are, it will require huge investments

to lay electric lines and install transformers.

It is also needed that work places in the rural areas should be concentrated as far as possible in order to free the farmers from arduous labour through the introduction of electricity in farm work.

In 1968, one year before electrification was completed in our countryside, the houses with no electricity were 8.8 per cent of the total farmhouses and they were all located scatteringly.

In those days, in accordance with the tasks set out in the *Theses on the Socialist Rural Question in Our Country* published by the great leader Comrade Kim Il Sung, modern dwelling houses were built on a large scale at state expense in our countryside.

These houses were constructed in combination with the work of bringing together the scattered farmhouses, on a scale suitable for the management of the socialist rural economy and thus the rural electrification was pushed forward at a faster pace.

3. Successful Realization of Electrification

Electrification in our countryside was completed with credit in 1969.

The completion of electrification brought about a radical change in agricultural production and the farmers' ideological and cultural life.

Electricity has entered all farm villages and farmhouses in our country. Thus the policy of covering all farm villages with radio rediffusion and TV networks, of introducing water supply in the farmhouses and converting rural clinics into hospitals has been successfully carried into effect.

Today our farmers are equipping themselves firmly with the immortal Juche idea authored by the great leader and improving their technical and cultural knowledge through the instrumentality of TVs, radios and loudspeakers. They get informed of the domestic and international events at the same time as in Pyongyang, the capital, and successfully carry out the tasks of the ideological and cultural revolutions by using all cultural and technical means.

In our countryside electricity is used not only at home but also in production.

The workteams and sub-workteams of all cooperative farms have fixed thrashing grounds using electric power, and livestock farms and workteams have power-driven fodder processing equip-

ment and various other facilities.

All the stationary operations such as thrashing and water lifting have been electrified in our countryside.

In agriculture electricity is widely used not only as motive power but also as the source of heat.

Our numerous modern chicken and duck plants use electric power for hatching and raising chickens, and the production processes of poultry plants and stock farms are being increasingly automated.

And electric power is widely used in drying and processing farm produce and treating seeds.

Our countryside now consumes as much as 2.2 billion kwh of electricity a year for home use and for motive power.

Few countries probably use electricity in the rural areas as freely as in our country.

Following the brilliant accomplishment of the historic task of rural electrification in our country, vigorous efforts are now being made to further expand its successes.

At the Sixth Congress of the Workers' Party of Korea the respected leader Comrade Kim Il Sung put forward the magnificent task of hitting the target of 100,000 million kwh of electricity, one of the ten long-term objectives of socialist economic construction in the 1980's.

Under the splendid plan mapped out by the respected leader many large and small hydro- and thermo-power plants will be built, and many power plants using atomic energy and other new power resources constructed. Then our power output will increase sharply and the level of rural electrification will rise ever higher.

Experience of the Democratic People's Republic of Korea in the Comprehensive Mechanization of Agriculture

Before liberation the material and technical foundations of our agriculture were very weak. Due to the imperialists' colonial rule our peasants did not even know what farm machines meant and did all farm work with their hands, using primitive small implements and carrying loads on their backs. Even the small farm implements like hoes and sickles were not much to speak of. So there was no developing agricultural production and farm work remained a most difficult and backbreaking job.

It was not until liberation that farm mechanization started in our country.

The great leader Comrade Kim Il Sung not only emancipated our peasants from exploitation and oppression for good, but energetically pushed ahead with farm mechanization to free them completely from the heavy labour.

In the early period of building a new society, pilot farm machine stations were set up in major agricultural zones to help the peasants in their work with tractors and other farm machines.

With the completion of agricultural reorganization along cooperative lines and rapid progress of industrialization after the war, the mechanization of agriculture got into its strides. In particular, since the great leader made public the *Theses on the Socialist Rural Question in Our Country* and defined it as a major component of the rural technical revolution along with irrigation, electrification and chemicalization, farm mechanization has made rapid progress and is now nearing completion.

The great leader Comrade Kim Il Sung said:

"In our country today farm mechanization and chemicalization have been almost completed, and farmers who in the past used to do backbreaking work transplanting rice and weeding by hand are now farming with ease and efficiency with the help of machines and chemicals." (*Report to the Sixth Congress of the Workers' Party of Korea on the Work of the Central Committee*, Eng. ed., p. 12.)

In our country today there are seven tractors per 100 *chongbo* of cultivated land in the plain areas and six in the intermediate and mountain areas. The farmers who were afflicted with all kinds of drudgery for thousands of years are now farming with the help of machines and chemicals and reap bumper crops every year.

This is attributable to the wise guidance of the great leader Comrade Kim Il Sung and is the brilliant fruition of our agricultural policy.

1. Orientation and Ways of Farm Mechanization

In farm mechanization we have held fast to the principle of settling all matters strictly in line with the specific conditions of our country.

Our agriculture has a series of characteristics in regard to the natural and economic conditions, crop composition and the system of land cultivation. Our country being mountainous, its arable land is limited, the fields are narrow, and ravines and patches of cultivated land are numerous. In addition, its topography is rugged and heavily undulated, so there are many hillside fields.

Reckoning with this, we effected farm mechanization in the direction of combining big machines with medium and small ones and of combining modern mechanization with simple medium- and small-scale mechanization. In employing tractors, too, we did not indiscriminately choose tractors of large capacities. We mainly used 28-hp tractors, combining them with 75-hp and 8-hp ones. And 4-hp engines were widely introduced for the mechanization of various operations, such as rice transplantation, spraying of agricultural chemicals, manuring and water pumping.

Our agriculture has some specific features in crop composition and farming methods. Rice holds the most important place in our agricultural production. Paddies make up 33 per cent of the total land under cultivation. Water stands in paddy fields all the time from the rice transplanting season up until before the harvesting season. This creates very unfavourable conditions for mechanized work. Therefore, farm machines used in paddy fields should in general be different from those employed in dry fields.

Our farming method is Juche-oriented. It demands doing farm work in a scientific and intensive way. It adheres to the principles of the right crop on the right soil in the right time and of increased number of plants per *pyong* and the principle of plant-by-

plant tending which makes each plant produce the maximum yields. And it emphasized the method of growing and bedding out seedlings in the cultivation of almost all crops including maize and vegetables, to say nothing of rice.

These characteristics of crop composition and the farming method make it necessary to produce various types of farm machines. They also demand great improvement of the quality of mechanized operations so as to produce high efficiency for timely performance of each crop's technical processes and to tend each plant meticulously for high yields.

If there is even one per cent of grain loss caused by mechanized work in the cultivating and harvesting operations, we deem it as serious. That is why in inventing and introducing farm machines we exerted efforts to make a machine multipurpose so that it may be used for various kinds of operations and ensure high work efficiency and quality to meet the requirements of the principles of the right crop in the right time and plant-by-plant farming. Reckoning with the conditions of our fields, farm machines were made suitable-sized, simple and handy.

What was most important in our farm mechanization was to mechanize rice-transplanting work. For thousands of years our peasants had bent their backs in the hard work of bedding out rice seedlings by their hands.

In order to free the peasants from this backbreaking work, the great leader Comrade Kim Il Sung taught in detail, in the course of scores of times of on-the-spot guidance and by making highly important remarks on hundreds of occasions, about the direction and ways of research on rice-transplanting machines, their designing and manufacture and even their names.

As a result, convenient, handy and efficient rice-transplanting machines were completed and turned out. In view of the conditions of our paddy fields, these machines were designed in different sizes, which are capable of transplanting ten or seven rows of seedlings at a time, and they can regulate the number of clusters per *pyong* between 70 and 170 according to the regional peculiarities of rice cultivation. Each of these machines, manned with an operator and one or two seedling-feeders, can manage 1.5-2.5 *chongbo* a day, that is, 15-20 times greater efficiency than in manual rice-transplantation.

With overall introduction of the machines, the labour-consuming work of rice transplanting is completed successfully in only 15 days throughout the country.

Our rice-transplanting machines enjoy a high reputation in the

developing countries where rice is cultivated. It won special prize in the International Commodity Exhibition held in Malaysia in 1980.

Various other farm implements and machines designed and manufactured to suit the specific conditions of our country are extensively employed in rice cultivation. They include revolving plough, harrowing wheel for tractor, rice harvester, rice thresher combine fixed at the threshing ground for threshing and sieving, and field-travelling thresher.

In maize cultivation, humus-pot-making machine, humus-grown seedling transplanter, seeder, additional fertilizer applying machine and agro-chemicals sprayer have been invented or manufactured and widely used. And maize-ear reaper and maize husker have been completed and maize thresher is put into use extensively.

As a result, in our country where the peasants once toiled and moiled with primitive implements, comprehensive mechanization has been effected today, and the firm foundation laid for a farmer to work five *chongbo* of rice fields and over ten *chongbo* of dry field and to reap high yields. And examples of comprehensive mechanization of rice and maize cultivation have already been set.

**Mechanization Rates for Major Farming Operations
(in percentage)**

	1970	1980
Ploughing of paddy and dry fields	61	100
Rice-transplanting	-	95
Harvesting	8	70
Threshing	87	100
Transport	59	100

On the farms in the northern highlands with favourable conditions for mechanization, a farmer tends 30 *chongbo* of wheat fields and over 10 *chongbo* of potato fields and produces high yields.

It is very important in farm mechanization to correctly define the order of priority, scope and ways of its realization in conformity with the socio-economic conditions of the country.

In view of the fact that rice cultivation makes up the greater portion of farming and the natural and economic conditions vary

in different localities, we expanded mechanization from the plain areas with vast rice fields to the intermediate and mountain areas. And we followed the line of gradually going over from the mechanization of such arduous and labour-consuming work as ploughing and carrying operations to the comprehensive mechanization of all work.

2. Laying of the Material and Technical Foundations for Comprehensive Farm Mechanization

Owing to the aftermaths of imperialist colonial rule, our agriculture had very weak material and technical foundations. For the rapid development of agriculture, therefore, it was imperative to build up industries that serve agriculture, so that plenty of various farm machines including tractors and other material and technical means were produced and supplied to the countryside.

This was a very difficult task for us who had no experience and lacked techniques. Our workers and technicians disassembled a tractor and measured dimensions of its accessories one by one, drawing several thousand sheets of blueprints, and at last succeeded in making a tractor by themselves by working on it with set teeth despite repeated failures.

The first tractor we turned out on our own, with our own techniques and materials, has begot a great fleet of tractors numbering tens of thousands today. The Kumsong Tractor Plant, for example, was an insignificant farm machine factory in the past, but it has now grown into a modern tractor plant capable of mass-producing various types of tractors. We now have many tractor factories.

In addition to these tractor factories, every province has trailer farm implement factory, tractor accessory factory and tractor repair factory, and every county has a well-equipped farm machine station and farm implement factory, thus helping cooperative farms efficiently.

It was an important task to train tractor operators in large numbers to keep pace with the rapid increase of tractors. In each county a tractor-operator training centre was set up on the one hand and, on the other, a movement was unfolded for every tractor operator to train a few operators himself. Thus, in our countryside today there are great numbers of couples and families who are tractor operators. There is a family whose nine members are all

tractor operators. At senior middle schools in the rural areas, too, the students are taught how to operate tractors and lorries. Thus the task of making all farmers operate tractors is being successfully carried out.

For the successful farm mechanization, a farm machine station was set up in every city and county and deep attention was paid to enhancing its role.

In our country farm mechanization did not proceed along the line of selling tractors and other farm machines to cooperative farms.

In view of the economic foundations of cooperative farms, of the prospects of development of the cooperative economy or of the technical aspect of the utilization of farm machines, it is reasonable that state farm machine stations hold exclusive possession of tractors and modern farm machines, but assign them permanently to the production units so that the cooperative farms can use them freely.

Today each county has a farm-machine station which, as the base of the rural technical revolution, strives to steadily expand the kinds and scope of mechanized operation, sharing the responsibility for agricultural production with the cooperative farms.

The struggle for mechanization of our agriculture has now entered on a new stage. We are striving to reach the goal of at least 10 to 12 tractors per 100 *chongbo* of cultivated land in the near future. To do so, we are going to manufacture and supply greater numbers of tractors and up-to-date farm machinery. At the same time, the work of rezoning land and terracing hillsides with fields is sped up to make standard plots of all paddy and dry fields for the efficient operation of farm machines.

We are going to expand the successes already achieved and introduce machines in the work of raising young seedlings and other operations which are not yet mechanized. Then all farm work will be done with the help of machinery and chemistry. When this task is fulfilled, overall farm mechanization will be completed in our country, with the result that the objective of industrializing agriculture specified in the rural theses will be accomplished.

Our experience shows that even if one takes over a backward agriculture from the old society, one can well cope with such difficult and complex tasks as the rural technical revolution and ensure a great increase in agricultural production if one pushes forward the revolution and construction from the unshakable Juche stand, displaying the revolutionary spirit of self-reliance with faith in our own strength.

Chemicalization in the Agriculture of the Democratic People's Republic of Korea

Farm chemicalization is an important guarantee for the rapid growth of agricultural production and the self-sufficiency of food in non-aligned and other developing countries.

The respected leader Comrade Kim Il Sung said:

"What is chemicalization? It is the widespread application of chemical methods to agricultural production. The manufacture and use of varied chemical fertilizers to make the land fertile, weed killers and many other kinds of agricultural chemicals—all this can be said to be chemicalization." (Kim Il Sung, *Selected Works*, Eng. ed., Vol. III, p. 12.)

Chemicalization is an important way to increase crop yields per unit area. Along with mechanization, it is an important means for freeing the peasants from arduous labour.

A new trend of development in modern agriculture, chemicalization was first introduced in the latter half of the last century and has developed ever since. It has brought about a great change in agriculture. Chemicalization has put agricultural production on a still higher scientific and technical basis, and bears a large share in the growth of farm production.

According to data, in the years (1977-1978) the world output of chemical fertilizers reached 49.61 million tons in nitrogen, 30.015 million tons in phosphorus and 25.762 million tons in potassium in terms of ingredient. Besides, silicon and various microelement fertilizers are widely used and herbicides and other agricultural chemicals are applied more and more extensively.

But the greater part of such chemical means is taken by the developed countries, and the non-aligned countries and other developing countries have only a small share.

Although the non-aligned and developing countries have the lion's share of the world's cultivated land, they are going through great difficulties in food and agricultural production. The main reason is that their agriculture has not been chemicalized.

The per-hectare grain output of the developing countries which are now having food shortage is no more than 1.5-3 tons, and even this sharply fluctuates from year to year.

If non-aligned and developing countries actively introduce chemistry in agriculture under the present conditions, this alone will enable them to increase grain output by far and to attain full self-sufficiency in food.

This has been borne out by the experience of our country where under the superb guidance of the great leader the food problem has been successfully solved in a historically short span of time through vigorous promotion of farm chemicalization.

Our country has now solved the food problem on its own by boosting per-chongbo grain output considerably. This is a fruit of farm chemicalization which has been realized with credit through the scientifically-substantiated utilization of chemical means while all branches of agricultural technology have made rapid progress. In our country the solid foundation of the chemical industry has been laid by ourselves.

1. The Laying of the Foundation of an Independent Chemical Industry

In order to realize farm chemicalization with success, it is essential to chart its direction and ways correctly.

The respected leader Comrade Kim Il Sung put forward the wise policy of building the firm basis of the chemical industry by our own efforts for agricultural chemicalization.

The chemical industry which serves the rural economy is a material basis for its chemicalization.

If any country should plan to realize chemicalization with fertilizers and agricultural chemicals purchased from other countries without building its own chemical industry, it will need an enormous sum of money and find it difficult to maintain its Chajusong.

A number of developed countries are unceasingly boosting the prices of fertilizers capitalizing on the food crisis which is deepening in recent years. They are more and more inclined to use fertilizers, along with cereals, as a lever of economic control and political pressure on the developing countries. This lucidly proves that one should build the firm foundation of one's own chemical industry for chemicalization.

In order to create the firm basis of our own chemical industry, we quickly rebuilt on a new technical basis the chemical factories wrecked by the defeated imperialists in their flight. We also constructed many new chemical factories by our own technique and with our own raw materials.

In a little over four years after starting the building of a new society we turned out 259,900 tons of fertilizer on our own to promote chemicalization in agriculture.

During the Korean war of aggression the US imperialists wrought terrible havoc on the chemical factories built by the creative labour of our people.

Putting up a militant slogan "Fertilizer precisely means grain and grain, socialism", the great leader Comrade Kim Il Sung intelligently organized and led the entire people in the struggle to build chemical factories.

True to the slogan, the Korean people, while quickly rehabilitating the demolished chemical factories, consolidated the foundation of the chemical industry on the basis of up-to-date technology including the synthesis of ammonium by anthracite gasification.

While rapidly increasing the production of nitrogenous fertilizer, we built up new production bases for phosphatic, potash and microelement fertilizers to be fed with domestic raw materials. Along with this, we built production bases for various agricultural chemicals suited to the actual conditions of the country.

Korea has many apatite fields although its grade is not very high. Thus, we have built up a number of phosphatic fertilizer production bases to use the local raw materials, because producing our own phosphatic fertilizer drawing on the home resources is safer than importing it. And firm bases have been laid for the production of potash and microelement fertilizers and agricultural chemicals including weed killers from domestic raw materials.

To prevent soil from becoming acid and further enrich it, we have increased the proportion of urea fertilizer and nitrolime in the production of nitrogenous fertilizer.

The rural theses had set the objective of increasing the application of chemical fertilizer per *chongbo* of sown area to more than one ton. This target was reached long ago by relying on our powerful chemical industry. At present the amount exceeds 1.6 tons. From 1984 more than two tons will be applied.

Nearly 20 kinds of agricultural chemicals including highly effective weed killers unharful to men are turned out to destroy weeds and eliminate blight and harmful insects.

The solid foundation of our Juche-oriented chemical industry which has been built in the spirit of self-reliance and fortitude is an important guarantee for pushing ahead with the chemicalization of agriculture and solving the food problem on our own.

2. Scientific Use of Chemical Means

In order to chemicalize agriculture we firmly established a scientific manuring system, besides stepping up the production of fertilizers and agricultural chemicals.

Establishing a scientific manuring system means correctly deciding the kinds and amounts of fertilizers to be applied in conformity with soil conditions and peculiarities of crops to ensure high yields and apply them plot by plot, crop by crop, at the right time and in a rational way.

Fertilizer plays a great role in increasing crop yields, but when it is used in an unscientific way, it cannot prove its true worth and may even produce an adverse effect.

We carried out the surveys of the actual soil conditions of all fields of the country to establish a scientific manuring system.

Growing with their roots in the ground, crops are largely subject to the influence of the soil conditions in the whole course of growth and fruition. Therefore, scientifically analyzing the actual soil conditions and, on this basis, applying the right fertilizers is helpful to both hastening the growth and fruition of the crop and enriching the soil.

Already in the 1950's the investigation of the soil of the cultivated land was conducted in our country and a scientific manuring system established in keeping with the nature of the soil. With the growth of fertilizer production and improvement of its composition a nationwide soil investigation was made on every plot on three occasions from the mid-1960's, analyzing even the microelement content of the soil and a scientific system was set up under which fertilizers are applied according to the nature of soil of each plot.

We intensified the studies of crops and saw to it that fertilizer is applied to suit the nutritional-physiological characteristics of crops.

Demands for nutrients vary from crop to crop and from

variety to variety. And the processes of metabolism of crops differ at each stage of their growth.

Therefore, it is an important guarantee for increasing the efficiency of fertilizer and crop yields to establish a system under which fertilizers are applied on the basis of scientific analysis of the nutritional-physiological characteristics of every crop and variety in each stage of their growth.

After deeply studying the soil conditions and the nutritional-physiological characteristics of crops we established a four-element fertilizer system, with silicon fertilizer added to the three major fertilizers—nitrogenous, phosphatic and potash fertilizers. In addition, steps were taken to apply slaked lime and different kinds of microelement fertilizers in a balanced way.

Silicon is one of the nutrients needed most by all kinds of crops. Microelements help the crops to overcome unfavourable abnormal climatic conditions. The arable land of our country was very short of silicic element and microelements indispensable for crops because it had been cultivated for a long time. So, it was essential to replenish them.

In Korea nitrogenous and phosphatic fertilizers are applied to grain crops at the ratio of 1:0.8-1.2 in keeping with the soil conditions and the characteristics of crops, and the proportion of phosphatic fertilizer is constantly increased.

A good deal of potash and silicic fertilizers are applied together with boron, copper, manganese, molybdenum, zinc and various other microelement fertilizers. And all kinds of fertilizers are applied in many instalments and punctually to suit the nutritional-physiological characteristics of plants at each stage of their growth. An appropriate amount of fertilizers is applied at each stage of crop growth: in rice farming nursery fertilizer, post-transplantation picking-up fertilizer, fertilizer for tillering, growth regulating fertilizer, earring fertilizer and grain-ripening fertilizer; in maize farming, nursery fertilizer, basal fertilizer, growth regulating fertilizer, earring fertilizer and grain-ripening fertilizer.

Besides, we are actively introducing various effective manuring methods. Fertilizers are mixed with organic manure, and machines are used to put fertilizer deep into the soil so as to prevent their wastage and uneven growth of crops.

In farm chemicalization great attention is paid to the scientific utilization of herbicides and other agricultural chemicals.

The scientific manuring system is to meet the nutritional demands of crops and increase their yields, and the scientific application of herbicides and other agricultural chemicals is to remove

weeds and prevent damage by blight and harmful insects by chemical means to free the farmers from hard work and provide favourable conditions for the growth and fruition of crops and thus increase the yields.

It is of special importance to use weed killers and other chemicals effectively in order to prevent damage by different kinds of weeds and by blight and harmful insects in good time.

In applying weed killers and other chemicals in our country the main stress has been put on checking the damage of weeds and blight and insect pests in advance.

First of all, a well-regulated national system of preliminary investigation and forecasting was established to prevent the spread of blight and insect pests by using agricultural chemicals.

On the basis of concrete investigation into the causes of blight and insect pests, their bioecological features, climatic and weather conditions favourable for their appearance and the data on the climate and weather of the given year, we scientifically foresee when blight and harmful insects will occur on a large scale and give information on them to the areas concerned. In particular, we find out the areas of habitual occurrence of blight and harmful insects and the kinds of pests and plant diseases most noxious for each crop in the given areas, and intensify preliminary investigation and forecasting. At the same time, we take timely measures against them to thoroughly prevent their occurrence.

In our country we stamp out all weeds and blight and harmful insects by using herbicides and other agricultural chemicals by stages in the whole period of crop growth.

In rice farming herbicides are sprayed on nursery beds and fields after transplanting rice seedlings, and in the maize fields weeds are eliminated by applying weed killers scientifically in proportion to the humidity of soil.

And we root out the sources of weeds and blight and insect pests prior to sowing. In our country all fields are ploughed twice and sprayed with various chemicals mixed in proper combination. This is a very effective way to prevent the appearance of weeds and blight and insect pests after sowing.

Great efforts are made to prevent herbicides and other agricultural chemicals from doing harm to people and crops.

It is allowed to mass-produce herbicides and other agricultural chemicals only when it has been found out that they are harmless to man after strict experiments on and analysis of their residual poisonous effects.

By carefully analyzing the biological, chemical, and ecological factors affecting the performances of herbicides and other agricultural chemicals, we make sure that they are harmless to people and crops.

Our country is now producing various herbicides including Nip, Simetryne and assorted herbicides, various agricultural chemicals such as Chlorophos and Methaphos, and growth accelerants such as C.C.C., Alphanaphthyl acetic acid. All these highly efficient chemicals are studied by our scientists and produced with our own raw materials and cause no harm to people and crops.

Besides, in our country various weeds and blight and insect pests are killed simultaneously with less labour outlay by using rational mixtures of herbicides and other agricultural chemicals. And chemicals are sprayed mechanically.

As is clear from this, deep attention has been paid to stepping up the production of fertilizers and agricultural chemicals and to putting their use on a completely scientific basis.

In Korea all crops always grow well uniformly whether it is sprouting season or growing and fruit-bearing seasons. This is because chemical means are used scientifically, while they are produced in quantities.

Today Korea is waging a vigorous struggle to free the farmers from hard work and definitely increase agricultural produce by pushing ahead more actively with farm chemicalization.

At the Sixth Congress of the Workers' Party of Korea the great leader Comrade Kim Il Sung put forward the important task of raising the yearly output of chemical fertilizer to a 7 million ton mark in the near future and turning out more fertilizers, agricultural chemicals and various other chemical means suited to the characteristics of our soil and crops.

When this task is realized, the amount of fertilizer applied per *chongbo* will increase, the level of chemicalization will rise further and agricultural production will grow at a still faster rate in our country.

Green Revolution Is an Important Guarantee for Increased Food and Agricultural Production

In order to rapidly develop food and agricultural production, the non-aligned and other developing countries should vigorously push ahead with the green revolution while improving the method of cultivation through alteration of growing conditions of crops.

The agricultural production in the non-aligned and other developing countries has not yet kept pace with the world standards owing to the aftermath of the predatory agricultural policy of the imperialists and colonialists. According to the data released by the Food and Agriculture Organization the world average per-chongbo grain yield was 2,041 kg in 1979, but that of the developing countries reached only 1,654 kg.

Following is the comparison of the world average per-chongbo grain yields of the most widely cultivated crops—wheat, rice, maize and potato with that of the developing countries.

The Major Crops' Average Per-Chongbo Yields in 1979

Crop	(Unit : kg)	
	World average	Developing countries' average
Wheat	1,782	1,463
Rice	2,615	2,513
Maize	3,271	1,697
Potato	15,503	10,245

The non-aligned and other developing countries have a large

amount of human and material resources as well as vast arable land.

Huge reserves for rapidly increasing food and agricultural production lie in accelerating the green revolution with credit while making intensive use of arable land through vigorous promotion of the rural technical revolution.

The green revolution is a creative work for man to alter the hereditary nature of crops in conformity with his will and demand. It is possible to attain much more food and agricultural products in the same soil and climatic conditions without additional investments, if the green revolution is successfully made to improve seed.

The average per-*chongbo* grain yields in our country reached only 2,516 kg in rice and 723 kg in maize in 1944, the time of colonial rule.

Thanks to the wise leadership and meticulous care of the respected leader Comrade Kim Il Sung the green revolution has dynamically been pushed forward, with the result that a lot of experiences and successes have been achieved in the Democratic People's Republic of Korea.

Today in our country agro-scientific and technical forces have been firmly built up, the green revolution is energetically conducted and our farmers do farming in a scientific way in compliance with the demand of the Juche farming method. As a result, in 1980 the per-*chongbo* grain yields reached 7.2 tons in rice and 6.3 tons in maize, and many farms in plains reaped 8-9 tons of grain per *chongbo*. In the northern alpine areas 20-30 tons of potato were harvested per *chongbo*.

We would like to introduce the experiences of the green revolution in the Democratic People's Republic of Korea, with a view to making even a little contribution to attaining self-sufficiency in food and rapidly developing agricultural production in the non-aligned and other developing countries.

1. Orientation of Green Revolution

The green revolution is a seed revolution to breed high-yielding seed strains even under the same conditions.

The respected leader Comrade Kim Il Sung said:

"In order to increase grain production in our country it is

necessary to successfully carry out the green revolution to obtain high-yielding strains."

Only when high-yielding seeds are bred, can we increase food and agricultural production and provide the people with an independent, creative and happy life.

The high-yielding seeds bred through the green revolution should accord with the following demands of the Juche farming method.

Firstly, the seed strains should suit the climatic and soil conditions of our country so that the principle of the right crop on the right soil in the right time can be observed.

Ours is a climate of the temperate zone with seasonal wind: there is a long spell of drought in April-June, flood in July and August, and strong wind in August and September.

In the northern alpine areas linked with the continent the period allowing the crop to grow covers only 100-120 days; accumulated temperature above 10°C is 2,000-2,400°C and rainfall only 500-600 mm. By contrast, in the south the growing season lasts 180 days; accumulated temperature above 10°C is 3,800°C and rainfall is 1,000-1,300 mm, twice as much as that in the north.

In recent years under the influence of cold front the phenomena of abnormal weather frequently occurred: spring comes later and autumn earlier; the period allowing the crops to grow becomes shorter, accompanied by drought and torrential rain.

The soil in our country greatly varies, ranging from tideland soil near the sea to volcanic pumiceous soil around Mt. Paekdu.

Such climatic and soil conditions require various high-yielding seeds adapted to those conditions. When such requirement is filled, the principle of the right crop on the right soil in the right time can be observed in all areas and cooperative farms in our country and agricultural production be rapidly increased.

Secondly, the seeds should fully meet the requirements for plant-by-plant farming.

Referring to plant-by-plant farming, the great leader Comrade Kim Il Sung said:

"Intensifying agricultural production precisely means doing farm work by means of tending crops plant by plant. Accordingly, in order to highly intensify agricultural production it is necessary, first of all, to increase actively the number of plants per pyong."

It is the invariable requirement of the Juche farming method to make full use of light, soil nutrients and moisture available

per unit area by planting crops closely and thus reap higher yields.

In order to do plant-by-plant farming properly by increasing the number of plants per *pyong*, crops should be of the strains which have low stature, strong stalks and big ears so that the weight of grains is much greater than now in comparison with the straws.

In compliance with such requirements, the green revolution in our country is carried on in the following directions:

Firstly, to produce early-ripening varieties. These varieties prevent every possible natural calamity and guarantee rich and stable yields. They prevent cold damages and ensure safe farming in the northern areas where the accumulated temperature is not so high, and make it possible for crops to withstand typhoon in August and September and allow two-crop cultivation as well in the southern plain areas.

The need for early-ripening varieties is more keenly felt under the condition where the period allowing crops to grow shortens and cold damage becomes severer. Early-ripening varieties, in general, produce small amount of anabolic products and are low-yielding, as the duration needed for their growth is shorter than that of late-ripening varieties.

Therefore, it is the demand of the green revolution to concentrate efforts on the production of early-ripening and high-yielding strains.

Secondly, to produce dwarf varieties of crops.

Short varieties allow crops to be planted closely and each plant to yield full crop, and ensure remarkable increase in *per-chongbo* yields. They are also stronger in resistance to wind than high-growing varieties and, therefore, enable crops to protect themselves from wind damage. They should also have a strong resistance to blight and harmful insects as they are planted densely and grow low with straight leaves, bearing big ears.

Thirdly, to produce good-quality varieties.

Farm products are used as food for people and raw materials for industry. Their quality, therefore, should agree with the taste of the people and be good enough to suit the purpose of production.

Starch crops should contain more amylopectin, which is to our people's liking, than amylose and oil-bearing crops and protein crops should have much oil and protein content respectively.

Fruits should taste sweet but little sour to suit the people's

taste and vegetables should contain various vitamins and other useful elements.

Maize to be used as fodder should contain a large percentage of lysine.

In the green revolution, efforts are made to produce good-quality seeds by means of introducing specific genes which decide the quality of crops.

Fourthly, to produce seed strains that are proof against adverse environment.

Crops are affected, in the course of their growth, by different unfavourable natural factors such as cold damage, oppressive heat, drought, flood, salinity in tideland, blight and harmful insects and so on. Such unfavourable natural factors may be warded off by developing appropriate cultivation techniques, but they should be coped with mainly by producing seeds strong enough to stand unfavourable natural conditions.

The green revolution solves this problem by collecting and utilizing the genetic resources created in different areas or by making a rational use of the specific genes contained in other crops and wild varieties.

The green revolution in our country was carried out not according to the above-mentioned separate direction but according to a comprehensive direction and purpose. The basic mission of our green revolution is to breed not merely early-ripening or low-growing varieties but the ones which ripen fast, with low stature and high quality, stand well unfavourable conditions, and are high-yielding so as to increase food and agricultural production of the country.

The green revolution can achieve the expected results only when it is based on the scientific methodology of seed production. In carrying out the line of the green revolution we apply various methods such as cross, hybrid, mutation, polyploid and haploid breeding according to the specific characteristics of different crops.

In particular, hybrid breeding is the main trend in our country.

As for maize, we obtain the desired hybrid of first generation by methods of creating several self-pollination lines and verifying their combinative abilities.

As far as the crops like broomcorn and vegetables that are difficult to create self-pollination lines are concerned, we use male sterility and self-incompatibility to obtain first generation hybrids.

On the basis of the advantage of the first generation hybrids that were obtained by making use of hybrid breeding, a brisk study is being made of the first filial generation of rice which belongs to the crops of self-pollination line.

In pursuance of the trends in which genetics develops from character inheritance to cytogenetics and molecule biology, a long-range research work is being conducted in our country in recent years so as to widely introduce the latest achievements of science and technology such as cell and gene engineering to the field of seed production.

2. Seed Selection System

Achievements made in the green revolution contribute to increasing food and agricultural production with the seeds multiplied through the scientific seed selection system. Seed selection is an undertaking to prevent the degeneration of crops and multiply seeds for production. Long cultivation of any seed strain makes it degenerate and decrease its yield and quality, no matter how good it may be. Therefore, seed selection is regarded as an important component of the green revolution.

In the Democratic People's Republic of Korea the state, in view of the importance of strains in food and agricultural production, is in charge of the seed selection and conducts the work on a scientific line to supply even cooperative farms with good varieties in a planned and uniform way.

In order to multiply strains, state seed selection farms are formed and operated in the areas with different ecological conditions taking into consideration the biological characteristics of and demand for the seeds concerned. Many competent technicians are assigned to seed selection farms, who organize and undertake scientific and technical seed selection work. The seed selection farms have thoroughly established irrigation system and are firmly equipped with the material and technical foundations such as farm machines, seed stores and the facilities for seed selection and disinfection.

Seed inspection organs are formed and operated in the capital and provinces so that the state may be in charge of uniform inspection of the seed production process as well as the quality of strains produced.

Seed strains produced are supplied in good time to all state and cooperative farms in a planned way and seed stations are working under the agricultural guidance organs in provinces, cities and counties to assume the responsibility for the technical guidance including the storage and control of seeds.

New strains as well as the ones already produced and introduced in accordance with the uniform seed production and supply system of the state retain a very high quality and are extensively introduced in time to all ecological areas suitable for the characteristics of the seed strains concerned.

Thus the achievements of the green revolution prove effective in a very short span of time in food and agricultural production.

3. Achievements in the Green Revolution and Scientific and Technical Cooperation

As a result of vigorous promotion of the green revolution great successes have been achieved in the Democratic People's Republic of Korea. All the seed strains of crops being cultivated in our country today were produced by our scientists and technicians themselves in cooperation with the agricultural workers.

The new varieties are all earlier-ripening, lower-growing and higher-yielding strains than those sown in the past. Duration needed for growth of all crop varieties including rice and maize was reduced by 10-15 days as compared with the former ones. The new varieties of rice including "Pyongyang No. 15," "Pyongyang No. 8" and "Yomju No. 14," which are now being cultivated are 80 cm in their height, 10 cm shorter than the former ones and they ensure 7-9 tons of yields per *chongbo* depending on regions and soil conditions.

The system of producing first filial generation of maize is generally introduced in maize farming. Maize strains like the "dent" breed sown in the past in our country were 3-3.5 metres high and we could plant only 20,000 maize plants in each *chongbo*. But the length of stalk of first generation of maize hybrids like "Unchon No. 5" and "Pyongnam No. 6" which are now popular is about 1.9-2.3 metres high, allowing 66,000-81,000 plants to be planted in each *chongbo*, thus ensuring a high yield of 6-8 tons or more per *chongbo*.

The newly bred first filial generation of sorghum is 1.5 metres high, 2 metres shorter than the previous varieties and its cultivation density increased from 50,000 plants to 180,000 per *chongbo* and its per-*chongbo* output is 6-8 tons.

The first generation hybrids have been introduced in the cultivation of most of vegetable varieties including cabbage, radish and cucumber and the per-*chongbo* yields increased to 150-200 per cent as against before.

High-yielding varieties of wheat, barley and potato have been produced to suit the alpine areas to contribute to the development of agricultural production in our country.

Today we have built a large army of scientists and technicians who are able to undertake and carry out the green revolution. During the period of the Japanese imperialist occupation there was not a single scientist with experience of breeding crops in our country. But today we have built a big contingent of scientists and technicians who are possessed of a high level of scientific theory and rich practical experiences in the field of production and selection of seeds, and they are successfully pushing ahead with the green revolution.

The scientific and technical cooperation in the field of green revolution is of great significance. Since the biological basis of the green revolution is the recombination of genes and mutation, the more genetic resources are available, the better result can be brought about.

Our country exchanges strains with many countries through scientific and technical cooperation. The Democratic People's Republic of Korea has dispatched its scientists and technicians to many countries in need of the scientific and technical cooperation to give them assistance in the field of green revolution and crop cultivation.

The scientific and technical test cultivation of seed strains of rice and maize produced in our country resulted in yields several times higher than before in some developing countries, thus contributing to the deepening of friendship and cooperation between countries and nations. A number of such good examples can be cited.

At the Sixth Congress of the Workers' Party of Korea the great leader Comrade Kim Il Sung opened up a bright prospect for attaining the goal of 15 million tons of grain and reclaiming 300,000 *chongbo* of tideland in the field of agriculture in the 1980's.

In order to carry out this honourable task we, in the field

of the green revolution, are striving to obtain new early-ripening, low-growing and high-quality strains of rice, maize and other crops which can guarantee more than ten tons of yields per *chongbo*.

At the same time stress is being laid on obtaining a new variety of rice that can stand well salinity in the fideland to be newly reclaimed and is high-yielding.

We will try to further strengthen our scientific and technical cooperation with the non-aligned and other developing countries on the basis of the theoretical and practical experiences gained in the green revolution.

Scientific Research for Increased Agricultural Production in the Democratic People's Republic of Korea

Modern science and technology hold an important position in increasing food and agricultural production.

The great leader Comrade Kim Il Sung said:

"The world of today is a world of science, and now is the time of scientific farming. Under no circumstances should we go by the old experiences; we should actively introduce advanced farming techniques." (*On the Problems of Socialist Economic Management*, Korean ed., Vol. 3, p. 440.)

Priority concern of every nation for the development of science and technology serves as a basic guarantee for increased food and agricultural production.

Intensification of agricultural scientific research is of particular importance at present in view of the continued abnormal weather.

1. Measures Taken for Agricultural Scientific Research

Proceeding from the role of science and technology in the development of rural economy, we have been ever developing agricultural scientific research on the principle of putting science before production at all times.

Firstly, in order to develop agricultural scientific research, we firmly built up the ranks of scientists and technicians, its masters and direct undertakers, as the most important measure.

Right after liberation there were only a few agricultural scientists and technicians in our country.

At that time the great leader Comrade Kim Il Sung made all the people contribute positively to the work of building the state by letting those with strength give strength, those with knowledge

offer knowledge and those with money donate money; he embraced old scientists and technicians and warmly led them so that they could actively turn out in the building of a new society.

Meanwhile, measures were taken for bringing up new scientists. We set up the university, a comprehensive national cadre training centre, though the situation of our country was very difficult immediately after liberation. Large numbers of technical universities were since established to train rapidly technicians and experts badly needed for the different fields of national economy and, in particular, we took bold steps to set up an agricultural university in each province and an agricultural college in every county for the agricultural development.

As a result, a huge army of Juche-typed agronomists and technicians which consists of both young and old intellectuals was trained in a short span of time in our country. This was a brilliant victory of the policy on intellectuals advanced by the great leader.

Secondly, in order to intensify agricultural scientific research we organized a large number of research institutions and established a proper guiding system for them in keeping with the stages of development of rural economy and the trends of the development of modern science.

Today in our country there is the Academy of Agricultural Sciences organizing and guiding the national agricultural scientific research in a unified way and under it there are branch academies in different areas and specialized institutions for different scientific sections. In the branch academies and institutions experimental centres are arranged such as agricultural experimental stations according to ecological places and experimental stock farms according to the species of domestic animals. The branch academies and institutions set the scientific research subjects for sectors concerned in accordance with the demand of agricultural policy and work out scientific research programmes on the basis of calculation of research forces and conditions of material supply to carry them out, geared squarely with the state national economic plan.

To enhance responsibility and role of the scientists in carrying out their research subjects, a scientific and administrative system of guidance is set up to assign definite subject to the individual researcher and sum it up in time.

Since agricultural scientific research itself is a creative work dealing with complicated nature and organisms a scientific and technological guidance to it cannot be ensured smoothly with administrative method alone.

With a view to strengthening substantial academic guidance to research work, therefore, scientific council of institute, sectional commissions according to the sectors of agricultural science and state deliberative commission on agricultural science are organized as nonpermanent organizations for collective consultation composed of competent scientists. Responsible before the state, they work out and submit technical measures for the present agricultural production and constructive opinions on the prospective development of science and technology while making academic deliberation mainly on the scientific research subjects and plans for their introduction into production.

Thirdly, we have directed deep attention to providing scientists with adequate research conditions and to laying the material foundations of the research institutions in order to strengthen the agricultural scientific research.

Agricultural research institutions have all the material and technological foundations for research such as laboratories and comprehensive analysis rooms equipped with modern experimental equipment and measuring instruments, modern greenhouses and pilot plants, to say nothing of experimental agro-stock farms. Thus, researchers undertake sophisticated basic and production experiments to their hearts' content.

Fourthly, we solve the urgent scientific and technological problems arising in the development of our agriculture by ourselves on the Juche-based stand, while assimilating the results and experiences of scientific research in other countries to suit our specific conditions.

Many varieties of seeds and study papers we had got through mutual cooperation and scientific intercourses with other countries, particularly with developing countries in the past, are greatly conducive to improving our scientific research and our scientists are sent to the developing countries requesting technical cooperation to give a great deal of scientific and technological assistance to them in their effort for increasing food and agricultural production.

Fifthly, we established an orderly system for introducing study results into production without delay in order to develop agricultural production rapidly.

If a scheme for introducing study results into production is submitted, it is considered first in the scientific council of the institute and then at the sectional commissions and the deliberative commission on agricultural science step by step to be ratified by the state.

New varieties of crops and domestic animals and new farming techniques approved by the state through such considerations are introduced in a planned way and dealt with at national short course on Juche farming method which is held every year for the farming population. They are carried in study manuals for the "agricultural science and technology publicity hall" of state and cooperative farms and immediately adopted and generalized in production.

Strengthening creative cooperation between scientists and producers is one of the important ways for making new agricultural science and technology introduced into production to bear a quick fruition. Only when the scientists find themselves among the producers and strengthen creative cooperation with them, can they have a timely and correct grasp of the scientific and technological problems arising in production practices and solve them quickly in conformity with the specific conditions.

At the final stage of their research scientists go to the state and cooperative farms and organize and undertake large-scale production experiments there together with producers, through this course "new farming techniques" or "new varieties of crops" are verified and grasped objectively for smooth introduction into production.

2. Achievements in Scientific Research

We built up firmly scientific research forces, established orderly the guidance system of scientific research institutes and provided satisfactory research conditions to them, with the result that the scientists are solving all problems ranging from scientific and technological problems concerning the immediate agricultural production to the prospective scientific and theoretical problems by themselves and, in this course, scored considerable research results.

Firstly, success in scientific research is production of many new variety of crops and their application to production by making green revolution, seed revolution with vigour.

In the early period of building a new society our agricultural scientists—seed producers started, first of all, with disposal of those degenerated and mixed seeds that had been handed down from the period of imperialist colonial rule and the experiments

for increasing the per-unit-area yields by setting up the system of seed selection.

Next, by applying various up-to-date methods of seed production, they have produced the seeds whose plants are of low height, early-ripening and high-yielding and can stand typhoons and frost damages, those suitable for double-cropping and those well adapted to fideland and mountainous areas.

In rice cultivation, we have introduced into production a number of new varieties including "Pyongyang line" and "Yomju line" with yielding capacities of 7-9 tons per *chongbo*. As a result, the total grain output of the country has increased remarkably.

"Unchon line", "Uiju line", "Pyongnam line" and many other newly produced varieties of hybrid maize with the yielding capacity of 6-8 tons per *chongbo* and well suited to different conditions of the respective areas, have been comprehensively introduced in maize growing. Thus, the per-*chongbo* yield has been doubled or trebled as against that before the introduction of hybrid seeds.

It is generally known that short and early-ripening varieties tend to decrease in their yields, but our new varieties, which have been produced in accordance with the Juche-oriented policy of seed improvement, are characterized by high yields inspite of their low height and early maturity.

Secondly, many successes have also been made in the field of crop cultivation.

Scientific research in this field began with laying scientific foundations for distribution of crops and varieties on the principle of planting the right crop on the right soil in the right time.

Our scientists made a systematic observation and analysis of meteorological conditions of each area of the country and carried out sensitivity experiment on meteorological phenomena and, on this basis, have created agro-climatic districts at the national level and agro-climatic sub-districts at farm levels on a scientific line.

Investigation and analysis have been made of the physical and chemical nature of the soil in each plot of the state and co-operative farms already on several occasions at the intervals of 3-4 years with the general mobilization of scientists, technicians and agro-students of the whole country to make soil card for each plot of the farm land, "history of a given plot," for the farms to have it.

With the preparation of such basic data, scientific distribution

of crops and varieties has been completed, measures have been taken to improve the soil of arable land and scientific manuring system and methods completed.

In the field of crop cultivation we have deepened the research particularly into rice cultivation by transplanting seedlings, one of the farming techniques of long history in our country to develop the method and technique of growing rice seedlings on cold bed using plastic cover.

Development of cultivation technique of transplanting humus-pot-grown seedlings for dry field crops including maize and vegetables has brought about a new turn in intensive dry field farming.

The introduction of advanced method of growing sound seedlings constitutes a major guarantee for attaining higher per-unit yield by shortening the vegetative period of crops and ensuring full yield for each plant even under the condition in which spring comes later and autumn earlier owing to the effect of the abnormal weather caused by the cold front.

Our agro-scientists, based on the brilliant successes of completed irrigation in agriculture, have made studies of moisture-physiological characteristics of crops, scientific methods of water control in paddy fields, water-sprinkling irrigation and other rational methods of irrigating non-paddy fields, and establishment of drainage system including drainage and improvement of cold and swampy ground and solved these problems with credit.

Thirdly, the scientists in the field of vegetables not only have scored successes in seed production but completed the system of multi-stage cultivation that ensures uninterrupted production of fresh vegetables all the year round by conducting their research into the methods of winter cultivation of vegetables in greenhouses, of growing vegetables in plastic-covered bed in early spring and of growing multi-crops in vegetable gardens.

As a result of the introduction of water-sprinkling irrigation system and intensive production in vegetable gardens, we are now able to produce 200-300 tons of vegetables per *chongbo* where previous yield of vegetables was 20-30 tons at most.

Fourthly, in the field of fruit-growing the nationwide regionalization of fruit growing was accomplished on the basis of research result in producing new varieties of various fruits including apples and pears that represent main species in our country, and the methods and techniques of cultivating dwarf fruit trees close together were developed.

Studies have been made of the methods of making the crown

of fruit trees and pruning their branches suited to the actual conditions of our country and of the scientific and technological problems related with fruit growing in the hillside fields.

With the introduction of the new successes of scientific research the yields of major fruits such as apple, pear and peach reached the high yield of over 20 tons per *chongbo*.

Fifthly, in the fields of the poultry breeding and stock farming big emphasis was put on making and introducing new varieties conforming to the conditions of modernization and industrialization in these fields while reducing degenerate varieties.

Typical in our country are the newly improved and bred varieties such as "Mangyong fowl," "Mansu fowl," "Kwangpo duck," "Pyongyang pig," "Pihyon pig," "Hyesan pig," "Hwadae sheep," "Korean goat," and so on, which have been widely introduced into production.

The scientists in the field of stock farming sought for all sorts of feed resources in our country and analyzed their feed value to write scientific prescription for mixed fodder and studied scientific method of breeding livestock in the conditions of the modernized poultry plants and farms and of the medium and small stock farms of cooperative farms.

The veterinary scientists focussed their efforts on the research work related with veterinary sanitary and anti-epizootic work, and made researches of and introduced highly efficient veterinary drugs, thus preventing for good various acute epidemics of domestic animals including rinderpest and pig pest which were rampant in the days of colonial rule.

Sixthly, mechanization and chemicalization have been effected in agriculture to emancipate for ever our peasants, who were freed from exploitation, from arduous labour.

The scientists succeeded in making rice-transplanting machine and made studies of the mechanism of herbicides and their apply methods. As a result, our peasants, who were engaged in back-breaking work of transplanting rice and weeding by hand for thousands of years, are now able to do farm work pleasantly and efficiently with the help of machines and chemicals.

It is entirely attributable to the wise leadership and boundless care of the great leader Comrade Kim Il Sung that today we have developed our agro-scientific research work to the level that it can reliably guarantee the food and agricultural production in our country which had not even a single research institution during the period of colonial rule in the past.

The great leader Comrade Kim Il Sung, saying that agro-

scientific research work should be developed among others if we want to develop agriculture, personally gave on-the-spot guidance on over 60 occasions to the agro-scientific research institutions and experiment plots and thousands of very important teachings since the first days of building a new country immediately after liberation up to now.

The great leader made an experimental plot in the garden of his mansion to go deep into the study of the biological nature of crops, and established experimental fields and farms in every part of the country to verify personally not only the research results gained in our country but also the latest scientific and technical successes in the world and taught our agro-scientists all the problems arising in the scientific research work one by one from its orientation to its ways and means.

As mentioned above, all the successes in the agro-scientific research work in our country are unthinkable apart from the immeasurable pains and concerns of the great leader.

Under the wise leadership of the great leader and the glorious Party centre our agro-scientific research work will produce greater successes in the future, which will greatly contribute to the increase of food and agricultural production.

We will further expand cooperation with the developing countries on the basis of the successes and experiences gained in the field of the scientific research in agriculture.

Experience of Rice Cultivation in the Democratic People's Republic of Korea

The great leader Comrade Kim Il Sung said:

"Because of our country's climatic conditions, we get the stablest and highest yields from the cultivation of rice." (Kim Il Sung, *Selected Works*, Eng. ed., Vol. III, p. 119.)

A crop adapted to our climatic conditions, rice is most stable and high-yielding.

Rice cultivation is of great significance in the food and agricultural production of the non-aligned and other developing countries, too.

Alongside wheat and maize, rice holds an important place in the world's grain production. Rice is a valuable food crop for the people of all continents, particularly Asia. Oil may be obtained from rice bran and rice straw is widely used as raw material for fibre and paper pulp. Rice bran cake is a good feed for domestic animals.

The area under rice cultivation of the world is 145 million *chongbo*, accounting for 11 per cent of the world's total arable land and about 19 per cent of the world's total area under grain cultivation. The output of rice amounts to 360-380 million tons, which occupies 24-25 per cent of the world's total grain output. However, the rice cultivation techniques of the world have not reached the level as they should.

The statistics of FAO show that the world average per-*chongbo* rice yield in 1979 was 2,615 kilogrammes and no more than 1.7-2 tons in many areas. In the past 20 years, per-*chongbo* rice yields only increased 548 kilogrammes.

The same can be said of our country during imperialist colonial rule: its per-*chongbo* rice yield was only 2.5 tons.

The great leader Comrade Kim Il Sung, after his triumphal return home upon the restoration of the fatherland, took a wide range of measures to develop rice cultivation and wisely led the agricultural workers to grow rice on a scientific basis by thorough-

ly applying the Juche farming method, with the result that the average per-*chongbo* rice yield in 1980 reached 7.2 tons over 650,000 *chongbo* of paddies.

Growth of Per-Chongbo Rice Yields

(Unit: kilogramme)

1944	2,516
1949	3,031
1960	3,072
1974	5,900
1980	7,200

Our experiences show that rice yields can be remarkably increased if its cultivation techniques are put on a scientific basis.

We are going to introduce in brief the experience of the Democratic People's Republic of Korea in rice cultivation with a view to contributing even a bit to the non-aligned and other developing countries in their efforts for self-sufficiency in food.

1. Rice Strains

Rice has been grown in our country for thousands of years and, in this course, our people have gained rich experiences in rice cultivation. According to the historical records, our people sowed and cultivated rice in dry fields as upland rice in areas where the soil had enough moisture from much rain in the initial stage of rice cultivation.

This method gradually gave way to direct sowing in watered paddies and, with the development of irrigation facilities, the method of transplanting was introduced in rice cultivation towards the 14th century. Since then the method of rice cultivation has undergone constant improvement and today it has developed to the method of transplanting and cultivating cold-bed rice seedlings, which is suited to our climate and soil conditions and brings about high yields.

Through this long rice cultivation our people have bred "Oryza sativa proles koreanis" and its several varieties, quite

different from "Oryza glaberrima" of the western African tropics, "Oryza sativa L., Subsp. B.G." of the Southeast Asian countries or "Oryza sativa proles indica" of India.

"Oryza sativa proles koreanis" has a series of characteristics distinct from others.

It has, first of all, strong resistance to low temperature and ripens comparatively early.

Though "Oryza sativa proles indica" is widely cultivated in the tropics with average annual temperature of above 17°C, "Oryza sativa proles koreanis" is cultivated in the temperate and sub-tropical zones including a part of China, Japan and parts of Soviet Union and Europe, as well as in our country where the average annual temperature ranges from 5-6°C to 16°C.

Besides, it has many good characteristics: it absorbs much fertilizer, gives high yields and has a strong resistance to *Xanthomonas oryzae* and other diseases, and its grains, when ripe, will not drop easily and contains much amylopectin.

Today we have numerous strains obtained from "Oryza sativa proles koreanis", scores of which are widely cultivated.

Characteristics of some typical strains are as follows:

The earliest-ripening varieties such as "Sonbong No. 9" and "Kapsanchal" are grown in the northern highlands up to 750 metres above sea level with an annual mean temperature of 5-6°C, requiring 2,500-2,800°C of accumulated temperature above 10°C needed for their growth.

The early-ripening varieties of rice including "Yomju No. 1," "Yomju No. 14", and "Tonghaechal" are grown in the northern intermediate zones with an annual mean temperature of 7-8°C, requiring 2,800-3,100°C of above 10°C accumulated temperature needed for their growth.

"Pyongyang No. 8", "Pyongyang No. 15", "Sohaechal" and other mid early-ripening varieties are raised in the plain areas south of the central part with an annual mean temperature of above 9°C, requiring 3,100-3,200°C of above 10°C accumulated temperature needed for their growth.

All these rice varieties grow 80-85 centimetres high, each of their panicles bears 65-75 grains, 1,000 grains weighing 27-29 grams, and the number of panicles per *pyong* is 1,400-1,500. These varieties guarantee 7-9 tons of per-*chongbo* yields.

In our country research work is carried on vigorously to produce more earlier-ripening, dwarf, and higher-yielding varieties of rice that are adaptable to all areas.

2. Rice Cultivation Based on Transplanting

Rice cultivation methods known so far in the world are the direct sowing method and the method of rice cultivation through transplanting.

The data of our long experiments show that the latter yields an average of one ton more than the former per *chongbo*. That is why the method of rice cultivation based on transplanting that ensures higher per-*chongbo* yields is extensively employed in our country.

For effective transplanted rice cultivation, strong rice seedlings should be grown before anything else.

By a strong seedling we mean that it has 6-7 leaves including imperfect ones and 2-3 panicles and is 18-20 centimetres tall. The ratio between carbon and nitrogen exceeds 10 in the leaves of such seedlings. The total accumulated temperature on the nursery beds should be 850°C or so to raise such strong seedlings, and in 50 to 55 days after sowing, seedlings may be bedded out. In order to grow strong seedlings early, they are nurtured on cold beds covered with plastic sheets.

Although the required area of cold-frame nursery beds for each *chongbo* of paddy fields varies a little according to regions, 180-250 *pyong* is the rule. Seeds are sown on the nursery beds from mid-March to its end.

Weeding of the nursery beds is done by spraying herbicide when barnyard grasses have one or two leaves.

Temperature on nursery beds should be controlled in conformity with the specific features of the growing seedlings during the whole period of their growth.

The cold-bed rice seedlings thus grown are pulled out and transplanted in the paddy fields from mid-May to its end. The temperature should be above 13°C at this time for the bedded-out seedlings to strike roots well.

For qualitative transplantation, the paddy fields ploughed in autumn, should be ploughed again and harrowed in spring before watering them. The paddy fields are watered a week before rice transplantation and harrowed again to make their surface even. Harrowing should be done well that the unevenness of the surface may be within 2-3 centimetres.

The per-*pyong* number of clusters that are bedded out differs according to geographical and soil conditions, but usually 120-125 clusters are placed in a *pyong* in the plain areas and 150-200 clusters in the northern highlands. The number of plants per cluster is 3-5.

For ages in the past our peasants bedded out rice seedlings by hands. But at present rice-transplanting machines are used extensively, so that transplanting is done easily and effectively. Ploughing and harrowing of paddy fields, too, are all carried out with tractors.

3. Water Control in Paddy Fields

In order to increase rice yields it is important to control water properly in the paddy fields on a scientific basis in conformity with the moisture-physiological characteristics of rice plants and soil conditions.

Eight tons of grain output per *chongbo* requires production of more than 16 tons of dry substance. In the course of producing such amount of dry substance 5,000-6,000 tons of water is consumed through evaporation from the leaves and water surface and 4,000 tons of water is lost through seeping into the ground. By the way, in our country the amount of water naturally supplied by rain during rice cultivation is 4,000 to 4,500 tons. Therefore, 5,000-6,000 tons of water is to be additionally supplied to produce eight tons of rice per *chongbo*.

Water control for paddies after transplanting is done in a different way to suit the moisture requirement of rice at different stages of its growth and the conditions of the terrains.

While rice seedlings are taking roots after transplantation, water in paddies is kept 5-6 centimetres deep to raise the temperature of water, which will hasten the root-taking of the seedlings. After the seedlings have struck roots, the water level should be lowered to 2-3 centimetres to facilitate the tillering of rice plants. And when the temperature keeps rising to exceed 16°C at night, the method of supplying water 2-3 centimetres deep and then drawing off alternately is introduced or water is supplied so little as to keep the soil of paddies in a state of saturation.

If rice paddies are thus watered shallow or little by little, the gap of temperatures between day and night will become larger

and more oxygen is absorbed into soil to increase the activity of the roots.

But in sandy paddy fields and in the northern highlands water is kept a little deeper to prevent cold damage. Contrary to this, if temperature in daytime in summer rises above 30°C and the gap of temperatures between day and night in paddy fields drops below 8-10°C, rice plants are damaged by high temperature.

In such case the method of streaming cold water into the paddies in a steady flow, alternate watering or soil saturation watering is applied to increase the gap of temperatures between day and night.

The paddies deeply water-logged by torrential rains in summer decisively hinder the growth of rice plants and the increase of yields. In cold and damp paddies and swampy paddies the roots of rice plants are less activated and, in serious cases, become decayed, which results in poor yields. Therefore, in such areas a perfect system of drainage by culverts and natural ditches should be set up and the drainage pumping stations be effectively operated.

30-35 days after their earing, rice plants require less moisture and in 40 days they are harvested. That is why a week before harvesting watering is stopped to dry the paddy fields for the convenience of harvesting work.

Water control for rice paddies is a responsible work decisive of rice yields. Therefore, in our country state and cooperative farms allocate water controllers to every workteam and sub-workteam and direct deep attention to elevating their standards of technical skills and sense of responsibility. And the technical personnel of farms take thoroughgoing measures to control water in the paddy fields on a scientific and technical basis.

4. Scientific Manuring System

Establishing a scientific manuring system and using fertilizer most effectively is a work of special importance in rice cultivation.

Our country pays deep attention to scientific and technological applying of various fertilizers to suit the biological characteristics of rice plants and the soil conditions of different areas.

According to experimental data, 650 kilograms of humic substance was wasted per *chongbo* every year in those fields to

which only chemical fertilizers were applied for 28 years. On the contrary, in the fields carpeted with 20 tons of compost per *chongbo* every year 130 kilogrammes of humic substance was accumulated. Hence, every effort is made to apply 20 tons of compost per *chongbo* every year so as to improve the fertility of soil.

In our country the application of chemical fertilizers per *chongbo* of paddy fields has reached 1.6 tons. The ratio between their ingredients—nitrogen, phosphorus and potassium—is approximately 1:1.2:0.6. Here the orientation for the future is towards increasing the rate of phosphorus and potassium.

In our country much silicon fertilizer is applied to paddy fields. Unlike other crops, rice plants absorb much silicon. Silicon plays an important physiological function in enabling rice plants to take in other nutrients better, in making their leaves and stems strong and in ensuring high yields even in unfavourable weather conditions. Therefore, in our country nitrogenous, phosphatic, potassic fertilizers plus silicon fertilizer are called four major fertilizers.

Besides, magnesium fertilizer, slaked lime and various other fertilizers are applied to paddy fields scientifically according to the results of soil analysis of different plots.

And in our country fertilizers are applied bit by bit several times to suit the biological characteristics of rice plants. Nitrogenous fertilizer is applied in many instalments on the basis of correctly fixing the ratios of fertilizer application in the stages of nutritional growth and reproductive growth of rice plants. Phosphatic and potassic fertilizers are also applied, classified into basal and additional dressings.

Failure in scientific application of fertilizer may reduce its effectiveness and do harm to rice plants, causing diseases. Therefore, the state and cooperative farms in our country scientifically regulate the fertilizing of each plot and its time, comprehensively studying the results of survey and analysis of soil, the growth of rice plants, and the meteorological conditions. A well-organized technical guidance system for scientific and technological fertilizing has been established in our country from leading agricultural organs to work-teams and sub-work teams of farms.

5. Weeding by Herbicides and Control of Blight and Harmful Insects

In our country all weeds in paddy fields are killed with herbicides. In our paddy fields there are not only various annual weeds such as "Echinochloa crus—galli" and "Scirpus juncoides" but also perennial weeds of nut grass family including "Potamogeton frashtetii", "Juncellus serotinus," "Scirpus triquefer," "Scirpus planiculmis" and "Eleocharis kuroguwai".

The annual weeds including "Echinochloa crus—galli" are killed by spraying Saturn oil and P.C.P. and the perennial weeds of nut grass family by applying M.C.P. or 2.4 D mixed with D.C. P.A. And "Potamogeton frashtetii" is killed by Prometrine.

Weeding by herbicides accounts for 97 per cent of our total area of paddy fields. This has freed our farmers from manual weeding in paddies, one of the difficult and backbreaking processes in rice farming.

It is one of the major prerequisites for raising per-*chongbo* rice yields to stamp out blight and harmful insects.

Diseases of rice plants in our country are "Piricularia oryzae," "Pellecuaria sasaki" and "Xanthomonas oryzae" and others, and harmful insects are "Hyarella griseola", "Chilo suppressalis," "Lema oryzae," "Cnaphalocrocis medinalis" and "Sogata furcifera" and the like.

To protect rice plants from blight and harmful insects, scrupulous agro-technological measures are taken in advance. In particular, we reduced the application of nitrogenous fertilizer and applied sufficient phosphatic, potassic and silicon fertilizers, so that rice plants grow strong enough to obviate various blight and insect pests.

And preliminary investigation and forecasting on the outbreak of blight and harmful insects are correctly undertaken in every region. Once they break out, various kinds of agricultural chemicals are spread intensively to eliminate them at their initial stage.

Harvesting is done either by harvester-combines with threshing done on the spot or by harvesters to windrow the cut rice plants for 2-3 days before they are sheaved and threshed by thresher-combines or mobile threshers.

Our country is conducting wide scientific and technological intercourses with the non-aligned and other developing countries in the field of rice cultivation.

Our scientists and technicians dispatched to the countries which call for technical cooperation in this field cultivated rice in consonance with the given geographical conditions, together with scientists, technicians and agricultural workers of those countries and gained many useful experiences and successes.

Seed exchange is also briskly carried on in the spirit of friendship and mutual cooperation.

In order to attain the magnificent objectives of socialist economic construction for the 1980's set forth by the great leader Comrade Kim Il Sung at the historic Sixth Congress of the Workers' Party of Korea, further progress will be made in our rice cultivation.

In the near future we will complete comprehensive agricultural mechanization and chemicalization and thus consummate the industrialization of agricultural production.

We will breed more new, early-ripening, short-statured, high-yielding strains of rice adapted to our geographical conditions and further develop rice cultivation techniques, thereby helping to reach the goal of 15-million-ton grain production.

In particular, rice cultivation techniques for high yields will be widely studied and introduced in the 300,000 *chongbo* of tideland to be newly reclaimed.

And proceeding from the idea of independence, friendship and peace, we will cement solidarity with the peoples of non-aligned and other developing countries and promote mutual co-operation with them in the field of rice cultivation.

Experience of the Democratic People's Republic of Korea in Maize Cultivation

Maize is the highest-yielding of all dry-field grain crops and its grain and stalk are of great economic value as they contain high nutriments.

Maize grain usually contains various nutriments, that is, 8-12 per cent of protein, 55-65 per cent of starch, 4-5 per cent of oil, 2.5-3.5 per cent of sugar, 2-3 per cent of fibrous material and 1-2 per cent of ash. Therefore, various kinds of foodstuffs, chemicals and medicines can be made from maize.

Maize stalk is used as good livestock feed and raw materials for fibre and paper.

Therefore, the expansion of the area under maize cultivation and development of its cultivation techniques are of great significance in solving the food problem, as well as in developing livestock and supplying raw materials to light industry.

As of 1979 the world's maize cultivation area was 120,540,000 *chongbo* and its average per-*chongbo* yield 3,271 kilogrammes. The average per-*chongbo* yield of maize was 5,447 kilogrammes in the developed countries, but 1,697 kilogrammes in the developing countries, only 31 per cent of the former, and, in particular, it stands at 1,145 kilogrammes in Africa.

If the developing countries, reckoning with the national economic importance of maize, expand its cultivation area, introduce the first generation hybrid system and improve its cultivation techniques to raise the per-*chongbo* yield to 3-4 tons at least, they will be able to obtain additionally a huge amount of grain, which will be greatly conducive to the solution of the current food crisis.

In our country maize cultivation was so backward that its per-*chongbo* output did not exceed 723 kilogrammes and the area under its cultivation, too, was limited during the imperialist colonial rule before liberation.

With a keen insight into the biological possibility to increase the maize yield, the great leader Comrade Kim Il Sung put for-

ward the slogan, "**Maize is the king of dry-field grain crops**" already long ago and wisely led our people to expand its cultivation area and improve cultivation techniques. As a result, in our country today maize cultivation is introduced in nearly all the dry fields, except those fields planted to some industrial crops and vegetables, and its *per-chongbo* yield reached 6.3 tons on an average in 1980 thanks to the thorough implementation of the Juche farming method.

With a view to contributing our mite to increasing food and agricultural production in the non-aligned and other developing countries, we introduce below our experiences in maize cultivation.

1. Seed Improvement of Maize and Its Cultivation Method

The great leader Comrade Kim Il Sung said that if only the problems of seed, water, fertilizer and herbicide were solved, *per-chongbo* yields of maize could be raised considerably.

What is most important in maize cultivation is to properly solve the problem of seeds. In our country the system of producing maize hybrid has been completely established through the vigorous promotion of the green revolution. Our maize hybrids belong to the early- and semi-early-ripening varieties whose accumulated temperature needed for growth is 2,200-2,800°C and which need 100-135 days' time for vegetation. Thus, the first generation of maize hybrid is cultivated in nearly all fields from the plain areas where the accumulated climatic temperature above 10°C is more than 3,000°C to the northern uplands 800-900 metres above sea level.

The distribution of crop areas for the first generation hybrid is strictly based on the principle of planting the right crop on the right soil in the right time. In order to prevent insufficient ripening caused by the influence of the cold front, maize hybrids of the kind whose required accumulated temperature for growth is over 200°C lower than the accumulated climatic temperature of the area concerned are chosen, and even in the same area hybrids that suit the fertility, humidity and other conditions of the soil of respective plots are chosen and sown in the right time.

With the successful carrying out of the green revolution in our country, the stature of maize plants becomes shorter steadily.

As we have storms in July and August, we have made it a rule to breed early-ripening and high-yielding maize hybrids of low stature. The maize strains we used to grow in the past were 3-3.5 metres tall and we could grow no more than 20,000 plants per *chongbo*, but today we have succeeded in obtaining hybrids which grow 1.9-2.3 metres high, and we now have 66,000-81,000 plants of them per *chongbo*. Based on the successes achieved so far, we are endeavouring to obtain within a few years the first generation maize hybrids with less than 1.7 metres' height that can yield over 10 tons per *chongbo* under the present production conditions.

In maize cultivation there are two kinds of methods: one is direct sowing and the other is humus-pot cultivation. The former is convenient for mechanization. But it can not ensure proper germination, resulting in the missing of many plants and poor ripening because spring comes late, autumn, early and severe drought lasts long owing to the abnormal weather. Therefore, we have introduced the latter in almost all maize fields. This method is: to put maize seeds into humus-pots with a diameter of 5-6 centimetres, cover them with plastic sheets until they put forth sprouts and then transplant them in the fields when each of them has 3-4 leaves. The seedlings should be raised in the humus-pot nurseries for 15-20 days and transplanted after the last frost of spring season. This method enables the seedlings to absorb adequate nutrition from the humus-pots, ensures better initial growth and hastens the ripening time by 7-10 days. This prevents maize plants from possible immaturity due to abnormal weather particularly in the mountainous areas and the northern highlands. Besides, if this method is introduced there is no missing plant and the number of maize plants per *chongbo* can be increased as the height of maize is low. There will be less weeds and no need for the work of thinning out maize plants as in the case of direct sowing cultivation. The humus-pot maize growing method, therefore, raises the yields by 15-20 per cent over the direct sowing method.

2. Application of Fertilizers and Weeding in Maize Fields

In order to increase the maize yields, it is necessary to esta-

blish a scientific manuring system to suit the soil conditions and the nutritional and physiological characteristics of maize.

In order to increase the number of maize plants per *chongbo* and ensure full yield of each plant through application of the principle of tending plant by plant, it is necessary not only to apply more fertilizer but also to apply it on a scientific basis. In general, the ingredients of nutrients needed for producing one ton of maize include 25-30 kilogrammes of nitrogen, 8-10 kilogrammes of phosphorus, 20-30 kilogrammes of potassium, 30-35 kilogrammes of silicon, 4-6 kilogrammes of magnesium, 4-6 kilogrammes of calcium and other microelements.

The great leader Comrade Kim Il Sung who long ago put up a slogan "**Fertilizer precisely means grain and grain, socialism**" took wise measures to increase the production of fertilizers and indicated correct orientation and detailed ways and means to set up a scientific manuring system in maize cultivation.

In our country, now, we apply a total of 1.5-1.6 tons of macroelement fertilizers to one *chongbo* of maize field, which resolves itself into 700-800 kilogrammes of nitrogenous fertilizer in terms of ammonium sulphate, 700 kilogrammes of superphosphate of lime and 100 kilogrammes of potassium chloride. Besides, on the basis of soil analysis, silicon, slaked lime, magnesium, zinc and other microelement fertilizers are applied in good assortment. And as for the material of humus-pots, 12-14 tons of humus compost is used for each *chongbo*.

The maize plant absorbs different doses of nutrients in different stages of its growth. Young maize plants do not have strong roots, so they cannot absorb nutrients well. Until it has eight leaves a maize plant absorbs only 1-3 per cent of the total nutrients it normally takes in during the whole period of growth, although the percentage may differ according to nutritional elements. This shows a small amount of fertilizer in the early days of its growth is enough to meet its demand for nutritional elements. Until it has 16 leaves, that is, ten days before its male inflorescence appears maize absorbs 25-40 per cent of nutrients (more in case of potassium), which is a comparatively small amount. But in one month from 10 days before to 20 days after its male inflorescence comes out, maize takes in some 50 per cent of total nutrients it needs during the whole of its growth period.

Different amounts of individual nutrients are needed in different periods of its growth. It sucks nitrogen throughout its growing season. It absorbs particularly much nitrogen from when its male inflorescence comes out till its tassels are dried up. After that

it sucks up less and then again absorbs plenty of nitrogen from the period when its grains are beginning to set till they turn yellow. So, we regulate the amounts of nitrogenous fertilizer accordingly in the first and second halves of its growing period.

The maize plant needs phosphorus all the time from its budding till its ripening. When it ripens, most of the phosphorus accumulated in its leaves and stalks moves to the ears. Therefore, phosphate is applied twice as basal and additional fertilizers.

The maize plant absorbs more potassium than the other nutrients. Potassium is needed from when its node is formed until its male inflorescence comes out. Therefore, potash fertilizer is applied in many instalments with emphasis on regulating fertilizer and fertilizer for forcing the earing.

In our country, the amount and methods of fertilizer application are different according to the nutritional-physiological characteristics of maize and the soil conditions. It is because the effectiveness of fertilizers and their required amount vary according to the soil conditions. We have worked out soil cards of all fields on the basis of analysis of macro- and micro-element content, acidity and mechanical composition of soil in each plot, and use them as basic data for establishing a scientific manuring system. Thus, fertilizers are applied not uniformly but in different amounts and ways by taking into consideration the characteristics of soil such as its types, its content of nutritive elements, mechanical composition and acidity, in accordance with the soil cards.

Also applied is the method of improving the fertility of soil by cultivating green manure crops as aftercrop of maize and ploughing them up in autumn.

Weeds should be killed thoroughly in order to increase the yields. Weeds absorb nutrients needed for the maize plant, take away the moisture of soil and spread pests and insects and thus lower the yields. Therefore, we spread highly efficient herbicides such as atrazine and 2.4 D in all maize fields to kill weeds completely, except where vegetables are grown as aftercrop.

3. Irrigation and Drainage of Maize Fields

The introduction of an irrigation system is a best way of increasing maize yields. The quantity of water needed by a maize plant in the whole period of its growth amounts to 200-250 litres.

This means that 13,200 tons of water is consumed in one *chongbo* of maize field.

The maize plant sucks up the largest amount of water in the period of pollination. In this period a maize plant sucks in 2-4 litres of water a day and maize plants in one *chongbo* of field take in 130-260 tons of water. If in this period, leaves droop for one day, the yields will fall by 15-20 per cent, and if for several days, by more than 50 per cent. Therefore, to keep the soil of the maize fields adequately moist through watering in different stages of its growth is a decisive factor in increasing the yields.

The amount of moisture required by the maize plant is not large in its tender period before nodes are formed, but after that it gradually increases.

Maize fields are watered by different methods—sprinkling by jets, watering by tractor-mounted sprinklers, irrigating by flowing water through furrows, etc. In order to secure water resources, different methods may be employed—building reservoirs and digging canals, lifting water by pumps, and using underground water by sinking wells and driving in pipes. The irrigation system has already been introduced in most of our maize fields, except some fields on steep slopes.

What is also important in successful maize farming is to take thorough measures for drainage. Our country has much rain in July and August. When the fields are soppy, oxygen in soil decreases, and this will obstruct the growth of the roots of the maize plant, weakening their functions of absorbing nutrients. This also gives rise to the occurrence of various virus and the decay of the roots and stalks, and makes the leaves dry, which will cause a decrease in the yields. In particular, without taking measures for drainage, in conditions of frequent torrential rains due to the abnormal weather, the damage of moisture cannot be checked. We, therefore, dig water collecting ditches around every maize field to prevent water flowing into the field and drainage ditches in the fields to keep rain-water from standing in the fields. As for the cold and damp fields, we also dig culverts or excavate underground water pockets of a mole's barrow type with tractors, and plough all maize fields deeply before the wet season comes to prevent the moisture damage thoroughly.

With the successful introduction of comprehensive mechanization in maize cultivation, most of the arduous and labour-consuming work from ploughing to sowing, furrowing, manuring, watering, chemical spraying, harvesting and threshing are done by machines.

The green revolution has been carried on vigorously and cultivation techniques developed thanks to the thorough application of the Juche farming method in maize cultivation, with the result that the per-*chongbo* maize yield in our country has grown 8.7 times as against the pre-liberation years and 5.2 times as against 1960.

**Annual Increase of Per-*chongbo*
Maize Yield (in kilogramme)**

1944	723
1949	1,331
1974	5,000
1980	6,300

In particular, per-*chongbo* maize yield on many farms in the plain areas exceeds 7-8 tons.

At the Sixth Congress of the Workers' Party of Korea the great leader Comrade Kim Il Sung put forward the important task of hitting the target of 15 million tons of grain production as one of the ten long-range objectives of socialist economic construction in the 1980's.

With a view to carrying out this magnificent long-range objective in the shortest possible time, we improve maize strains by accelerating the green revolution, keep expanding maize cultivation areas by breaking up new land and steadily develop its cultivation techniques through the implementation of the Juche farming method. We are also waging a vigorous struggle to completely industrialize and modernize maize cultivation through the accomplishment of the comprehensive mechanization and chemicalization of agriculture.

Our experience in maize cultivation may be of some help to other developing countries. We are ready to assist the developing countries at any time if they want to learn from our techniques and experiences of maize cultivation.

Experience of Intensive Vegetable Cultivation in the Democratic People's Republic of Korea

For our people, vegetable is one of the important non-staple foodstuffs from olden times. But, before liberation, in the days of imperialist rule, the technique of its cultivation was so backward that its per-chongbo yield was only 20-30 tons and the annual share of vegetables per capita was 60-70 kg.

The wise policy advanced by the great leader Comrade Kim Il Sung for the development of agriculture after liberation and his sagacious leadership for its implementation has brought about a rapid development in vegetable cultivation.

The great leader Comrade Kim Il Sung taught as follows:

"What is most important in turning out subsidiary foods is to grow different kinds of vegetables in abundance.

"Vegetables are one of the most important non-staple foodstuffs indispensable for our people's life." (*On the Problems of Socialist Economic Management*, Korean ed., Vol. 3, p. 472.)

Thanks to the deep solicitude shown by the fatherly leader, today around urban communities and workers' districts, have been laid out solid vegetable-producing centres which have sprinkling irrigation systems and are well equipped with various material and technical means.

With the thoroughgoing application of the Juche farming method to vegetable cultivation, the vegetable output of our country increased 2.5 times in 1980 as against 1960. Vegetable production has been freed from the restriction of seasons and increased 4-5 times in comparison with its per-capita supply of pre-liberation days. Our people are not only supplied with varied fresh vegetables in all seasons but also even exporting surplus vegetables to other countries.

Our country has intensified vegetable production in the main vegetable gardens to raise the per-unit-area yield and, at the same time, exerted efforts to further develop affercrop vegetable cultivation following the harvest of maize so as to produce and

supply vegetables sufficiently, while increasing grain production of the country.

We hold fast to the principle of the right vegetable on the right soil in producing vegetables. It is most important in producing vegetables to select a right place for their cultivation.

In the past vegetable plots were generally laid out on the alluvial soil of river basins. So vegetable cultivation in such fields was very unstable as the fields were flooded in the rainy season and affected by the cold and dampness.

The great leader, taking such situation into full account, advanced a wise policy on laying out vegetable plots on elevated grounds which had so far been considered impossible to be used as vegetable fields. As a result, in Pyongyang and other big cities and workers' districts vegetable gardens were laid out on hillsides, land was improved and readjusted and irrigation and drainage systems introduced, thus ensuring secure vegetable cultivation no matter what drought or flood may come.

The distribution of species and varieties of vegetable crops is based on the principle of the right vegetable on the right soil according to the climatic and soil conditions of the regions concerned. In plain areas where the average temperature is 23-24°C in summer, 3 or 4-crop cultivation is introduced combining fruit vegetables such as cucumber, pumpkin and eggplant, while in the northern and mountainous areas where the temperature is about 20°C in summer and the duration needed for the growth of vegetables is short, 2 or 3-crop cultivation is applied. In alpine areas that are over 800 metres above sea level one or two-crop cultivation of leaf and root vegetable is introduced.

We are powerfully pushing ahead with the green revolution in vegetable production to further diversify the species and varieties of vegetables and expanding the area under the cultivation of high-yielding and good hybrids of the first generation.

With the improvement of material and cultural living standards of the people their demand for vegetables increases further. Before liberation there were not diversified species and varieties of vegetables; vegetable cultivation was limited to growing radish, Korean cabbage, red pepper, cucumber, pumpkin and stone-leek in spring and autumn.

But now, more than 70 species and over 200 varieties of vegetables are cultivated so that fresh vegetables are produced not only in spring, summer and autumn but even in winter to be supplied to the working people all the year round.

In spring (March to May) we produce spinach, stone-leek,

leek, tarragon, lettuce, spring Korean cabbage, red radish and other vegetables and in June and July scores of species of vegetables including pumpkin, cucumber, eggplant, potato, tomato, melon, watermelon, parsley and summer Korean cabbage. Eggplant, cucumber, pumpkin, radish, cabbage, red pepper and many other vegetables are produced even in August and September, when the temperature is high and there is a big rainfall. In autumn, various kinds of vegetables such as radish, Korean cabbage, carrot, red pepper, onion and stone-leek are mass-produced for storage and as raw materials of *kimchi* peculiar to our people's dietary life.

Therefore, we are producing a number of early-maturing and high-yielding vegetable varieties of good-quality, which are well adapted to different seasons, and further developing their cultivation techniques.

Special emphasis is laid upon the production and wide introduction of first generation hybrids of vegetables employing particularly the principle of heterosis. The first generation hybrids are now introduced in nearly 100 per cent of the areas under autumn cabbage and radish cultivation and also in large areas under the cultivation of cucumber and other vegetables. With the introduction of the first generation hybrid system in vegetable cultivation, the yields increased by 30-50 per cent as compared with those of the past when pure varieties were sown.

High and stable yields of vegetables are ensured in our country by the overall introduction of sprinkling irrigation system in vegetable plots.

In general, vegetable crops require much water. The reason is, first of all, that vegetables contain more water than other crops. Water content accounts for 92 per cent of Korean cabbage leaves, 96-98 per cent of cucumber, 94 per cent of tomato and 89 per cent of spinach leaves. Besides, more water is needed for vegetables to form one gram of dry substance than for grain crops. The water needed for cucumber to form one gram of dry matter is 600-700 grammes and for tomato 600-900 grammes. This means that they consume 1.5-2 times more water than grain crops.

Though vegetable crops require a lot of water, we have long spells of drought in May and June, and in September and October, the best months for vegetables to grow in our country.

The comparison of rainfall with evaporation in the plain areas on the west coast shows that the latter is more than 2 times as much as the former; the rainfall is 69.6 mm in May and 84.3 mm in June whereas the evaporation amounts to 200.4 mm in May and

181.8 mm in June. What is worse, there are many cases in which a dry weather lasts over 20 days after a rainfall.

Like this, the characteristics of vegetable crops and our weather conditions are not favourable for vegetable cultivation. Vegetable cultivation, therefore, was not stable in the past, and its output depended on the frequency of rain, affecting the people's living.

In order to do away with such shortcomings completely in vegetable cultivation, the great leader personally set an example of sprinkling irrigation system for vegetables and gave wise guidance to generalize it throughout the country.

In our country, now, the sprinkling irrigation system has been introduced in the whole of vegetable cultivation areas, the period and amount of irrigation determined and scientific watering system established to suit the biological characteristics of each vegetable crop and the soil conditions. Thus, no matter what severe drought may come, we are able to cultivate vegetables steadily without bad harvest.

With the introduction of sprinkling irrigation system the per-*chongbo* yields of vegetables increased more than 2-3 times and the quality of vegetables also improved. In co-op farms around Pyongyang and other cities the sprinkling irrigation system has been introduced to produce more than 300 tons of vegetables per *chongbo* a year.

In our country the method of increasing the per-*chongbo* yields of vegetables through multi-crop cultivation is widely studied and introduced.

Generally, the vegetative period of vegetable crops is short, and the duration of their growth in the fields has become shorter as they are mostly cultivated in a way of transplanting humus-cake-grown seedlings. Along with this, a number of vegetables are cultivated in different seasons according to their species and varieties. Proper combination of these species and varieties makes it possible to make maximum use of land and cultivate 3-4 crops a year, gathering harvests all the year round and increasing per-*chongbo* yields.

For vegetable cultivation each of our cooperative farms has established a multi-crop cultivation system for each plot on the basis of its variety distribution programme and the soil and man-power conditions.

Examples of 3-Crop Cultivation

No.	1st crops (yield per <i>chongbo</i>)	2nd crops (yield per <i>chongbo</i>)	3rd crops (yield per <i>chongbo</i>)	total yield per <i>chongbo</i> (t)
1	spring Korean cabbage (100 t)	cucumber (50 t)	autumn Korean cabbage (150 t)	300
2	spring radish (20 t)	melon or water- melon (40 t)	autumn Korean cabbage (150 t)	210
3	spring Korean cabbage (100 t)	eggplant (50 t)	autumn radish (60 t)	210
4	spinach (40 t)	tomato (40 t)	autumn Korean cabbage (150 t)	230

In case of the first crop, seeds are sown in early spring or before winter and harvesting is over between April and early June. If vegetable crops are cultivated in plastic-covered beds in early spring when the temperature is low, the minimum temperature will rise by 2-4°C, which brings the harvest time 20-30 days earlier than usual and increases the yields by 30-50 %. This method is widely applied to the cultivation of many vegetable species including cucumber, pumpkin, Korean cabbage, watermelon and melon.

In summer when the temperature is high and it rains much we make vegetable beds high and plant varieties strong enough to stand high temperature and humidity. And in this season there are many blights and harmful insects, so we either grow disease-resistant varieties or change crops to prevent damage by pests and insects in order to reap full crops.

Autumn vegetables are planted in August and September after harvesting summer greens or grain maize, so we grow them in advance by means of humus-cakes before bedding them out in the fields. To raise the yields of autumn vegetables we apply plenty of manure, plant them closely in the right time, irrigate the fields with sprinklers once every 5-7 days during dry weather of autumn and ward off noxious insects such as flea beetles and plant lice.

When we cultivate the 4th crops, we grow Korean cabbage between the rows of other vegetables which are thinly planted to supply young Korean cabbages to the people when vegetables are in short supply.

In our country vegetables are cultivated in large quantities as the aftercrop of grain maize to raise the utility rate of land.

The great leader, in full consideration of the fact that maize fields are lying idle for 7 months except the period from May to late August and early September when maize cultivation is available, set forth the policy of cultivating extensively autumn vegetables as the aftercrops of maize. Under the condition of our country which has limited arable land, this enables us to produce large quantities of autumn vegetables without expanding the area of vegetable fields while ensuring grain production.

Our scientists are vigorously conducting their research work to increase the yields of grain maize and autumn vegetables as aftercrops of maize by producing early-ripening and high-yielding crossbreds of both maize and vegetable and by developing their cultivation techniques.

In vegetable cultivation we raise markedly per-unit area yields by tending vegetables carefully plant by plant to increase the number of plants per *pyong* and make every plant bear a good crop.

For proper plant-by-plant cultivation, we grow seedlings of various vegetables in humus-cakes before transplanting them. In the past, the humus-cake seedling method was only applied to some vegetables including cucumber planted in spring time. But now, this method has been introduced in cultivating not only early-spring vegetables but also summer and autumn vegetables.

When vegetables are directly sown, they grow unevenly and young ones are liable to suffer damage by blights and insects causing a loss of many plants. This brings about a decrease of over 30 per cent in the yields.

But the introduction of the humus-cake seedling method enables us to ensure the number of plants per *pyong* by raising strong seedlings evenly and yield fine crops from all plants by providing good nutrition for vegetables throughout the duration of their growth. At the same time, this method is advantageous in shortening the vegetative period of vegetables and raising the land utility rate.

For increased vegetable production we apply fertilizers in a scientific and technical way to suit the characteristics of vegetable species and soil conditions.

We spread plenty of good-quality organic compost as basal dressing because vegetable crops reap high yields in a short vegetative period.

We also apply various kinds of fertilizers such as nitrogen, phosphate, kalium, calcium, magnesium, boron, manganese and molybdenum fertilizers properly combining them to suit their

characteristics. The amount of fertilizers applied per *chongbo* may differ according to the vegetable species and soil conditions. But generally, 900 kg of nitrogenous fertilizer in terms of ammonium sulphate, 500 kg of superphosphate of lime and about 200 kg of potassic fertilizer are applied. We apply mainly nitrogenous fertilizer for leaf vegetables in combination with other fertilizers, and mainly phosphatic and potassic fertilizers for fruit vegetables in combination with other fertilizers. And we apply additional fertilizers several times in conformity with the characteristics of vegetable species absorbing nutritive substance in each stage of their growth.

To prevent various pests and insects from breaking out in vegetable plots, disinfection of soil is properly conducted, and a crop-changing system established for the vegetable crops with differing characteristics. In this way all the vegetable plants are well tended so that they may yield full crops.

In our country many truck gardeners are trained every year in the agricultural universities in provinces and in the agricultural colleges in counties. And vegetable research institutions are organized and operated in every province.

In the 1980's researches on the creation of vegetable varieties will be carried out more vigorously in our country and a new big stride will be made in winter-vegetable cultivation under glass, early-spring-vegetable cultivation in plastic-covered beds and the vegetable growing on the fields in spring, summer and autumn.

Experience of Fruit Growing in the Democratic People's Republic of Korea

Fruit growing is of importance in the improvement of the material and cultural standards of the people, for it promotes their health, develops the foodstuff industry and adds greatly to the country's landscape. It is also conducive to economic co-operation with other countries because it expands the country's sources of export.

Our fruit growing has a history of thousands of years. But in the past the socio-economic limitations checked its development. The imperialist colonial rulers monopolized most of the orchards and carried away at will the produced fruit, which was a link in the whole chain of their predatory agricultural policy. To make things worse, the US imperialists unleashed an aggressive war and indiscriminately bombed cities and the countryside, thus making havoc of even the small number of orchards.

It is thanks to the wise guidance of the great leader Comrade Kim Il Sung who put forward a superb policy on fruit culture and guided our people for its implementation that our fruit growing could make rapid progress.

Today large-scale state and cooperative orchards have been laid out and the area under fruit cultivation has reached 300,000 *chongbo*. 8,000 *chongbo* of state orchard was built on the western coast in South Hwanghae Province, which gave birth to a new administrative district called Kwail (fruit) County. With the development of fruit-growing science and technology, the fruit yields rose 4.7 times in 1979 as against 1960.

The varieties of fruit have been further improved. Ours is a temperate zone fruit culture in which apple growing is predominant. Our weather conditions in autumn when a serene weather lasts long especially favour apple cultivation and ensure high yields of good apples. Apples take a large share in the total fruit output. The strains of apple widely planted number more than 20.

Pear ranks second to apple in importance. Pear is our indigenous speciality which is well adapted to summer when we have much rain. The pear trees bear many flowers and produce rich fruit every year. An average of 20-30 tons of fruit is picked per *chongbo*, and 40-50 tons in the orchards where the trees are well cared for.

Besides, trees of various stone fruit such as peach, plum, apricot, cherry and date and trees of shell fruit such as chestnut and walnut are grown widely in our country, and vines are also cultivated to some extent. In the southern regions with a mild climate, persimmons are grown extensively, while on the northern highlands, 1,300-1,400 metres above sea level, blueberries are produced in large quantities and widely used in the food processing industry. In recent years, measures have been taken in our country to encourage the growing of various fruit trees such as of cherry, apricot, date, chestnut and persimmon, which are easy to tend and require less agricultural chemicals.

Because various kinds and varieties of fruit trees are grown in rational combination in our country, plenty of fruits are picked from May to November to satisfy the needs of the population and also are widely used as raw materials for light industry. In the food processing sector, local industries have been extensively developed in each county simultaneously with large-scale modern central industries, with the result that the locally produced fruits are procured and processed in time. Meanwhile, everywhere modern storage facilities with a storage capacity of hundreds of tons and medium and small semi-underground store-houses have been built to store and supply fruits all the year round until the next fruit season.

Our fruit growing is characterized mainly by cultivation on hillsides. Mountains occupy nearly 80 per cent of our territory. Therefore, raising food and industrial crops including cereals in plain areas and developing fruit growing by clearing hills was an objective demand fully justified both in view of the comprehensive utilization of land and the development of agricultural production.

Therefore, the great leader Comrade Kim Il Sung personally called in April 1961 the historic Pukchong Enlarged Meeting of the Presidium of the Central Committee of the Workers' Party of Korea and took wise measures to propagate to the whole country the experiences of Pukchong County which set an example in hillside fruit growing. In response to the call of the great leader and the glorious Party Central Committee, the whole

Party and entire people came out to reclaim hills throughout the country in a short span of time and built large numbers of new orchards. This brought about a new historic turn in the development of fruit culture in our country. The state and cooperative orchards of hundreds or thousands of *chongbo* size which can be found all over the country today were mostly built at that time.

Construction of networks of roads and terraces on slopes to facilitate mechanization and improvement of distribution of species and cultivation techniques made it possible to prevent soil erosion and to produce large quantities of high quality fruits.

Our fruit growing is rapidly developing in the direction of cultivating fruit trees of low height. The green revolution has been vigorously carried on in fruit growing too so that fruit-growing techniques of lowering the height of apple, pear and other fruit trees and planting them close together to raise yields are studied and widely introduced in production. Apple trees of short stature have been introduced and their statures have now been shortened from 4-5 metres to 2-3 metres, and the per-*chongbo* number of trees has increased from 200 in the past to 800-1,500 now. The height of pear trees has also become very small and their per-*chongbo* number has increased from 400-500 to 800-1,500.

Deep study has been made on the relations between the variety of fruit trees which are grafted and the characteristics of the low trees to which the grafts are fixed, and the techniques of tending the orchard of low-statured fruit trees. As a result, at present apple or pear trees of low stature start bearing fruit in 2-3 years after planting young trees, and give over 20 tons of fruit yield per *chongbo* in 7-8 years, whereas in the past it took 7-8 years to pick the first fruit after planting young trees, and only after 15-20 years the trees produced fruit in large quantities. The short apple trees not only produce good-quality fruit and high yields every year, but also have advantages making it possible to mechanize work and tend trees with ease.

Great efforts are made to put fruit growing on a modern and scientific basis in our country. Irrigation system has been introduced in most of orchards except those on steep hillsides. Taking into account the nutritional and biological features of soil and fruit trees, and according to the level of fruit yields, various macro- and micro-element fertilizers are sufficiently applied in proper assortment. Although there may be slight difference depending on the qualities of soil, species of fruit and their yields, the amounts of chemical fertilizers applied per *chongbo* of fruit-

bearing orchard are in general about 100 kilogrammes of nitrogenous fertilizer, 95 kilogrammes of phosphate, and 75 kilogrammes of potash fertilizer in ingredients. Large quantities of humus soil is spread over the orchards, the system of growing green manure crops widely introduced, and measures for improving the soil of orchards taken.

The plant protection system has been firmly established to prevent various kinds of blight and harmful insects in orchards. We have intensified the work of preliminary observation and forecasting against blight and insects, take thoroughgoing agro-technical measures to prevent their damage and to actively protect and multiply useful insects. And when orchards are infested with harmful insects, we spray agricultural chemicals with highly efficient sprayers 10-12 times a year, and 7-8 times in the less affected orchards.

We trim and prune fruit trees on a scientific basis according to their species and ages to suit the actual conditions of our country on the basis of deep study of the specific features of their growth and fruit-bearing. In early spring, before the fruit trees begin to bud, highly skilled trimmers prune the trees one by one on all orchards.

In order to develop fruit-growing science and technology and provide technical guidance for production, pomicultural departments are set up in the agricultural universities in all provinces and in the agricultural colleges in counties. Thus, in this field a large number of engineers and assistant engineers are trained by ourselves.

A pomiculture research institute of national significance and specialized experimental farms for different regions and fruit species have been organized everywhere. These organizations are pushing ahead vigorously with researches to put our fruit growing more firmly on a modern and scientific basis.

Drawing on the successes and experiences already gained, we will increase fruit production considerably and fully industrialize fruit growing by completing its comprehensive mechanization and chemicalization.

Experience of the Democratic People's Republic of Korea in the Modernization of Poultry and Livestock Farming

In our country the centuries-old backwardness of animal husbandry, an aftereffect of colonial rule, has been eliminated in a short space of time, and a new brilliant page has been turned in poultry and livestock farming, which is Juche-oriented.

The great leader Comrade Kim Il Sung said:

"An energetic struggle should be waged to further consolidate its existing foundations and put stockbreeding on a modern basis so that our backwardness in this field—a hangover from the past—may be eliminated and the output of animal products be decisively increased." (Kim Il Sung, *Selected Works*, Eng. ed., Vol. IV, p. 584.)

Modernization of poultry and stock raising is an essential demand for the elimination of backwardness in this field and its rapid development. It is also a basic guarantee for producing more animal products with less labour and fodder and fully satisfying the growing demand for them. This modernization is a decisive factor in freeing the working people in this field from arduous and insanitary work and raising their cultural and technical standards.

From a desire to make our people live as well as other peoples, the great leader Comrade Kim Il Sung has personally built up, in a brief span of time, modern poultry and livestock farming which can produce eggs and meat by industrial methods.

As a result, the Mangyongdae Chicken Plant with an annual production capacity of 100 million eggs, 10,000-ton duck and pig plants, quail, goose and many other big and small plants have been built in all parts of the country. This contributes a great deal to the betterment of the people's livelihood.

1. The Principle in the Modernization of Poultry and Livestock Farming

We adhered to the principle of solving all problems arising in modernizing poultry and stock raising strictly from the Juche stand in keeping with our realities, by using our own technology, designs, machines and equipment.

In distributing chicken and pig plants, we took care to place them near the consumer areas and gave consideration to the problem of sewage disposal.

Big chicken and duck plants were placed in the vicinity of large cities and workers' settlements. Using them as the parent body, we set up branch plants close by rather small workers' settlements. We built pig plants in maize producing zones with due consideration to consumer areas. This enabled us to use as fertilizer to maize fields several hundred cubic metres of sewage flowing through pipes every day. This is the most reasonable measure because we could solve the problems of both increasing maize yields and preventing environmental pollution.

In building chicken and pig plants, we reckoned with the natural and economic conditions and the convenience of the raisers. When we were deciding on the sites for the construction of chicken plants, we took into account the limited crop area of the country in the first place and then the interests of epizootic prevention. So, they were built at the snug foot of mountains. And we made three-storied chicken coops in consideration of the stature of the raisers. We also made feeding and water-supplying devices and egg collectors to suit our actual conditions.

We correctly determined the order of priority in creating modern poultry and livestock industries.

Great amounts of funds, materials and equipment are required to build up-to-date poultry and pig plants. It is therefore impossible to construct various kinds of plants at one time in all regions. We adhered to the principle of giving priority to big cities and workers' districts where industries are concentrated, and of building poultry plants ahead of pig plants.

This was due to the eating habits of our people who from olden times preferred chicken and eggs. Moreover, poultry is easier to raise by industrial methods than other domestic animals,

its production cycle is short, and it is a very profitable investment to raise poultry because feed consumption per unit of its products is small.

After modern poultry and livestock farming was built up, we organized production on the principle that they increased output and, at the same time, gave active assistance to cooperative stock raising.

While producing animal products, poultry and pig plants supply cooperative farms with breeding stock and eggs, thereby greatly contributing to poultry and livestock farming of the country as a whole.

2. Ways of Modernizing Poultry and Livestock Farming

In the 1960's we put forward the policy of modernizing animal husbandry by making effective use of its existing foundations and took active measures to carry it out.

As a result, new modern poultry and pig plants, pedigree-stock and breed-animal farms and assorted-feed factories were built on an up-to-date scientific and technical basis in only a few years. This made it possible to mass-produce animal products by industrial methods.

The following measures were taken to modernize poultry and livestock farming:

First, chicken, duck and pig plants were built in a brief span of time through a nationwide movement by actively drafting local materials and manpower with the powerful support of industry.

All working people—factory and office workers, youth and students, men and women, young and old—took an active part in the building of modern poultry and stock raising centres, displaying high patriotic zeal.

For the construction of the plants, the state supplied only some kinds of materials and equipment which were locally unavailable and saw to it that the local reserves were tapped in the supply of timber and other materials. The state provided standard designs of chicken coops, incubators, feeders and other equipment and ensured that the engineering factories in the neighbourhood of the plants made them by way of social aid.

In this way it was possible to quickly build many chicken,

duck and pig plants in the local areas on their own without a heavy outlay by the state.

Second, an independent assorted-feed industry relying on domestic raw materials was created.

At present, the big and small assorted-feed factories constructed in every province and county fully satisfy the demands in the given areas.

The prescriptions for assorted feed could ensure high productivity because they were based on the analysis of the ingredients of the domestic raw feed materials.

In particular, in view of the world-wide "protein feed crisis", deep attention has been paid to attaining self-sufficiency in feed by producing various yeasts by industrial processes.

Third, the firm foundations for raising breeding poultry and stock were built to suit the modernization and industrialization of poultry and livestock farming, so that a well-regulated system of supplying breeding animals was established.

To this end, we built up pedigree-stock farms for different species and breeds of domestic animals, where superior pedigrees are produced and supplied periodically to breeding-bird and stock farms for propagation. Then they are distributed to the poultry and pig plants. These plants create hybrids of the first filial generation from them and use these hybrids in production. And in order to improve pedigree stock systematically scientific research institutions breed new superior strains and give them to pedigree-stock farms.

With the establishment of a unitary system of producing and supplying pedigree stock and breeding animals in the country, the productivity of domestic animals is systematically rising.

Fourth, while poultry and livestock farming was modernized, the state policy of prophylactic veterinary medicine was thoroughly implemented.

All units raising domestic animals are waging a vigorous struggle to protect them against all kinds of diseases under the slogan, "Sanitation first, sanitation second, sanitation third."

Chicken, duck and pig plants are surrounded by trench-like anti-epizootic ditches and fences to prevent snakes and other wild animals from slipping in.

The animal tenders and other limited people are allowed to go in and out of the plants through a quarantine room furnished with facilities for bathing, disrobing and disinfection.

Breed eggs, hatcheries, and instruments for animal raising, not to speak of the inside and outside of the pens, are thorough-

ly disinfected by antiseptic solution and ozonized air. Raw materials for assorted feed are also disinfected.

Preventive inoculations against infectious diseases are regularly given in the chicken, duck and pig plants and all other places where domestic animals are reared.

Veterinary drug factories equipped with up-to-date facilities produce various necessary preventives and diagnostic liquids on their own.

Thanks to the establishment of the anti-epizootic system infectious diseases of domestic animals which raged in our country before liberation such as chicken pest, pig pest, cattle plaque, foot-and-mouth disease and brucellosis were completely eliminated a long time ago and fowl diseases including Marek's disease and leucosis disappeared.

Fifth, production centres for machines and equipment necessary for the mechanization and automation of work in the poultry, and pig plants have been solidly built up.

Already from the early stage of the modern poultry industry, great attention was paid to freeing the tenders from back-breaking labour and increasing their per-capita output. Our poultry and stock raising machine factories turn out machines and equipment for assorted-feed factories, feed-processing machines, incubators, chicken coops, feeders, ventilators, automation gauges and all other devices on their own.

The repairs and maintenance shops which have been built in poultry and pig plants with social assistance serve well as repair bases of the plants concerned and, moreover, contribute to the further acceleration of the mechanization and automation of production processes in the plants through technical innovations.

Sixth, primary attention has been paid to the training of technical personnel in poultry and livestock farming and scientific researches in this field have been kept ahead of production.

Before liberation we had only a small number of livestock technicians and veterinarians as in other branches of the rural economy. And there was no research institution in the veterinary and stock- and poultry-raising fields.

In order to train our own technicians in this area, the state took measures after liberation to establish a veterinary and animal-husbandry university and set up an agricultural university in each province and an agricultural college in each county. As a result, within a short period of time we came to have a big army of qualified technicians and specialists who could run large-scale modern chicken and pig plants in a scientific and technical way.

In order to develop scientific researches in poultry and livestock raising, we organized research institutes specializing in its different scientific branches and laid their firm material and technical foundations.

At present the Academy of Agricultural Sciences has under its wing the Poultry Engineering Research Institute, the Veterinary Research Institute and the Animal-Husbandry Research Institute, under which are functioning the experimental stock farms for different domestic animals.

These institutes have specialized research groups for the studies of breeding, feed, rearing and fending, veterinary and epizootic prevention, stock-raising machines, management of animal husbandry and other branches. These groups cope with the problems of immediate production techniques and the scientific and theoretical problems for the future.

3. Successes Scored in Poultry and Livestock Farming

With modernization and industrialization pushed forward vigorously in our poultry and livestock farming, the output of animal products increased rapidly.

In 1980, 400,000 tons of meat and three billion eggs were produced. This means that the production of eggs increased 25 times and meat, 4.5 times as against 1960, that is, before the application of industrial methods in the production of animal products.

As the level of modernization in poultry and stock farming rose, the standard of feed consumption per unit of animal products fell markedly.

Feed consumption is: some 120 grammes per egg, 2.2 kilogrammes per one kilogramme of duck, two kilogrammes per one kilogramme of chicken, and 4-4.5 kilogrammes per one kilogramme of pork.

The number of fowls and domestic animals reared by each fender has increased to 6,000-10,000 laying hens, 15,000 capons, 13,000 quails and 2,000 porkers respectively.

With the successful progress of modernization in poultry and stock raising, the working people who could not afford to eat eggs and meat at all before liberation, are now able to have them at all times.

All these achievements in poultry and livestock farming are the brilliant fruition of the wise guidance of the great leader Comrade Kim Il Sung who has devoted his life entirely to the good of the people. He showed the orientation and ways for the development of the Juche-based animal husbandry and guided the people to implement them.

Today, poultry and livestock farming is confronted with the task of further consolidating the existing material and technical foundations and placing technical and economic management on a new scientific and technological basis to turn out more animal products at lower costs.

When this new task is fulfilled, production will be normalized on a higher industrial basis in the chicken, duck and pig plants, so that egg and meat production will increase markedly and the people's demands for animal products will be satisfied still better.

Training of Agro-Technicians and Elevation of Technical and Cultural Standards of the Farmers in the Democratic People's Republic of Korea

One of the important questions in increasing agricultural production and achieving self-sufficiency in food is to improve the work of training agro-technical personnel and raise the technical and cultural levels of the farming population.

The great leader Comrade Kim Il Sung said:

"All-round technological reconstruction of the national economy calls for more scientific and technical cadres and for high cultural and technical standards on the part of the working people." (Kim Il Sung, *Selected Works*, Eng. ed., Vol. III, pp. 107-08.)

The master of agricultural production is the farmers themselves and agricultural production is developed by them. Therefore, in order to increase food and agricultural production, the agricultural population, its masters and direct performers before anyone else, should be trained to be powerful social beings with independent thinking and creative ability.

This can be solved successfully only when both training agro-technical personnel and raising the ideological, technical and cultural standards of the agricultural population are properly organized and carried out.

1. Training of Agricultural Technical Personnel

How to train national cadres including agro-technicians is a question of key importance which decides the future of the country and the destiny of the nation. In particular, this poses as a more important question in the newly independent countries freed from the colonial yoke of imperialism. In order to successfully build a new prosperous society in the countries liberated from

colonial rule, they should wipe out as soon as possible the cultural backwardness, a remnant of the old society, and train their own national cadres who will shoulder the destinies of their countries.

In the days of imperialist colonial rule there was not a single higher educational institution in our country and the sons and daughters of the working people could not receive even elementary education. That is why after liberation our country was extremely short of national cadres and had only a few agro-technicians. This was one of the greatest difficulties in developing agriculture and building the economy and culture as a whole.

Immediately after liberation when the general situation of the country was indescribably difficult and we had neither experience in running an institution of higher learning nor teachers nor textbooks, the great leader President Kim Il Sung attached great significance to training national cadres and saw to it that this work was kept ahead of all other work.

As a result, in 1946 Kim Il Sung University was founded as the first university in our country and patriotic teachers and scientists were called together to run the university by their joint efforts. Drawing on this experience, 15 universities including an agricultural university were newly established within only 4-5 years after liberation.

After the war the building of socialism made rapid progress and this made the demands for agro-technicians still more urgent.

As agricultural cooperativization was completed and the socialist rural economy equipped with modern technique, a great change took place in the development of the productive forces of agriculture.

Under such circumstances, it was impossible to solve the rural question more quickly without boosting up the training of technical personnel.

In order to meet the increasing demand for technical personnel the Government of our Republic took a series of measures to increase the number of institutions of higher education and reorganize their chairs. As a result, an agricultural university was set up in every province and an agricultural college in every county. The agricultural universities in the provinces are training engineers for different fields in a number of faculties and chairs—farming, breeding, vegetable growing, fruit growing, livestock farming, sericulture, plants of economic value, conservation of plants, pedology, agricultural mechanization, agro-chemistry, land development, agricultural administration—and are training engineers for each field. In addition, our country has such agro-technical

universities as veterinary and livestock university, hydraulic university, and university of agriculture and forestry. The agricultural colleges in counties are training associate engineers for many fields including farming, fruit growing, livestock farming and farm machinery.

Each agricultural university has an agricultural research institute for the study of theoretical and practical problems arising in the development of agricultural science and technology and in the training of the agro-technical personnel.

Besides, the University of National Economy and central and provincial agricultural administration cadre schools have been set up with a view to bringing up agricultural management cadres capable of skilfully running large-scale socialist agriculture.

Along with the regular educational system, the Government of the Republic is expanding and developing the study-while-working system for the working people to study without quitting production work.

Under the condition that tremendous work of socialist construction and educational work have to be pushed ahead simultaneously, the regular education system alone can hardly meet the growing demands for technical personnel in short time.

The study-while-working system enables the working people to continue studying without leaving their work places. So it makes it possible to accelerate the intellectualization of the whole society through the education of the entire people while energetically pushing ahead with socialist construction.

Our agricultural universities and colleges are actively giving education through the study-while-working system.

Under the educational programmes of the correspondence and evening courses, school texts and reference books are provided to the students beforehand, so that they can always study at their work places.

In the farmers' slack seasons, teachers go to the farms and guide the students through the medium of lectures on theoretical problems and experiments.

As they are mainly engaged in practical work, the people who are enrolled in the study-while-working system are taught a great deal of theories urgently needed for the revolutionary practice and immediately apply them to the practice of socialist rural construction.

According to the *Theses on Socialist Education* advanced by the great leader President Kim Il Sung, an energetic struggle is

waged to establish Juche in the training of agro-technical personnel in our country.

Food and agricultural production is carried on with each national state as the unit and its masters are its own people. Every country has different environments and conditions which influence agricultural production, and their agricultural tasks are also different. Accordingly, the training of agro-technical personnel should be conducted in conformity with the actual conditions of each country and the interests of its people; it should be Juche-oriented education to make people masters of their own agriculture.

We have thoroughly established Juche against funkeyism and dogmatism in the training of agricultural technicians, putting the main emphasis on our own agriculture in instruction. We teach the students to solve all agro-technical problems by their own efforts in keeping with the realities of the country and the interests of the people. As for foreign science and technology, they are taught from the Juche standpoint to suit our own specific conditions and actual situation.

We have firmly established Juche in the training of agro-technical personnel by intensifying education in the Juche-based farming method, the most advanced and scientific farming method best suited to our actual conditions, whose advantages and vitality have already been clearly proved in practice.

At the same time, we are constantly supplementing and enriching the content of education with due consideration for the requirements of the developing reality and the new scientific and technical achievements. Especially, we closely combine education with production activities so as to firmly equip the students with useful, living knowledge applicable to rural work. Combining theory with practice is an important way to educate the students to be competent technical personnel equipped with useful, living knowledge.

Agricultural universities and colleges have their own experimental farms with a view to combining theoretical education with practical training. At the same time, they have experimental plots on cooperative farms to study and clarify scientific and technical problems arising in the development of agriculture. In principal farming seasons, teachers and students go to the countryside and responsibly give scientific and technical assistance to the farmers in their farm work.

Agricultural universities and colleges train technical personnel, study agricultural science and technology and give

assistance to the countryside from the standpoint that they are scientifically and technically responsible for agricultural development in the areas where they are located.

Education is most thoroughly free in all its branches including the training of agricultural technical personnel on the principle that the state assumes full responsibility for the education of the people.

Universal free education at state expense is possible because the means of production and the educational establishments belong to the state and the people, and the interests of the state and the people in educational work coincide with each other.

Students of universities and colleges are studying as much as they please with nothing to worry about, enjoying the benefits of free education and even receiving scholarships from the state.

With the strengthening of the work of training agro-technical personnel, large numbers of competent engineers, specialists and associate engineers are reared in our country every year.

Right after liberation, our country had not a single institution of higher learning and there were only a few agro-technicians. But it now has a large army of technicians, so that an average of 57 technicians and specialists are working on each cooperative farm. In our countryside technicians and specialists are creditably playing the role of vanguard in rapidly developing food and agricultural production and speeding up the ideological, technical and cultural revolutions.

2. Elevation of Technical and Cultural Standards of the Agricultural Population

For increasing food and agricultural production, it is important to raise the technical and cultural standards of all agricultural population, in addition to training agro-technicians in large numbers. Only when the farmers are on high technical and cultural standards can they actively introduce the achievements of modern science and technology in production to develop the agricultural productive forces and build a civilized and modern countryside in a short span of time.

Right after liberation the overwhelming majority of our rural population were illiterate owing to the foreign imperialists' policy of stamping out our national culture. In this situation, to abolish

illiteracy among the broad sections of the peasantry and to raise their cultural level was a prerequisite for the building of a new country.

In 1946 our people's government adopted a decision on eliminating illiteracy and launched a vigorous nation-wide, all-people anti-illiteracy campaign. As a result, in only a few years after liberation illiteracy was wiped out among our adult population and they were equipped with some cultural knowledge to become the masters in building a new society.

However, the cultural and technical level of large numbers of peasants was still low although they got rid of illiteracy after liberation, they had had no opportunity of schooling under colonial rule in the past because they had been poor and downtrodden. So, following the anti-illiteracy work, we set up working people's schools and working people's middle schools in farm villages, so that all agricultural population could continue to study.

From the first days of building a new society deep attention was paid to the education of the rising generation, along with adult education. For this purpose schools were set up in the villages in a mass movement.

The rising generation are the pillars who will shoulder the nation's future and the successors to our cause. Therefore, strengthening the education of children and youth up to the working age is a question of special importance in raising the technical and cultural standards of all farmers in the future.

The great leader Comrade Kim Il Sung called children "kings of the country" and "flower-buds of the future," and grudged them nothing in their education.

Following the introduction of universal compulsory primary, secondary and then nine-year technical education in our country, universal eleven-year compulsory education involving a year of pre-school and a ten-year school education was enforced in 1972. Universal eleven-year compulsory education is free education which combines general and technical education on a high standard.

Today our pupils and students are growing up to be reliable reserves of the builders of socialism who are mentally well prepared, morally sound and physically strong. They seasonally receive textbooks and school uniforms free of charge under the best socialist educational system.

As a result, our countryside is now constantly replenished with young people who have finished senior middle school courses.

Thanks to adult education and the regular education of the younger generation in the countryside, all our agricultural population have the general knowledge of the middle school graduate or higher and are now striving to attain the intellectual level of the senior middle school leaver.

In order to build a new prosperous society, it is necessary for all working people to acquire a high level of technical knowledge, along with general knowledge.

All our farmers are striving to master more than one technique. Every year short courses on the Juche farming method are organized at central, provincial, county and cooperative farm levels on the basis of scientific and technological analysis of the year's farming when it is over. With regard to important technical matters, model and demonstration lectures are arranged to teach the farming method in practice.

Every cooperative farm has agricultural science and technology publicity halls as the base for widely disseminating among the farmers a wide range of know-how on agricultural science and technology by means of object and visual lessons.

Skilled worker training schools have been organized and are run in all parts of the country with a view to elevating the technical and skill level of the farming population. Every province and county has a school for training skilled agricultural mechanization workers to train tractor operators, motor drivers, and farm machine operators. Besides, we have set up training schools for skilled workers in vegetable cultivation, fruit growing, poultry farming, livestock raising, veterinary and other branches in all parts of the country to impart necessary technical know-how.

In particular, the role of young intellectuals is improved in raising the technical and cultural standards of our rural people.

At present young intellectuals are dispatched to the countryside as members of three-revolution teams to play the role of vanguard in carrying out the ideological, technical and cultural revolutions. Our young intellectuals equipped with the Juche idea are now bringing about uninterrupted technical innovations in the countryside, teaching the farmers and making an active contribution to elevating their ideological, technical and cultural standards.

With a large army of technicians and specialists prepared and the farmers' standard of general and technical knowledge markedly rising, our state and cooperative farms equipped with up-to-date technology are operated excellently by ourselves and

our agriculture is making rapid progress on a more modern and scientific basis.

In pursuance of the policy of intellectualizing the whole society, we are now further improving the quality of education in keeping with the demands of the developing realities and, at the same time, are pushing ahead prospectively with the work of giving higher education to all agricultural workers by establishing farm colleges and agricultural colleges on a study-while-working basis and widely running a college on TV.

On the basis of the experiences already gained, our country is further expanding and developing mutual cooperation and exchange with the non-aligned and other developing countries in the field of training agricultural technical personnel.

A great number of students from non-aligned and other developing countries in different parts of the world are enrolled and trained in our agricultural universities and many other technical universities. Besides, short technical courses and practical studies on management and operation are arranged for their specialists. Our scientists, technicians and specialists are sent to foreign countries to give help in training their skilled workers, technicians and cooperative farm management personnel.

In future, we will make all efforts to further strengthen the cooperation and the ties with the non-aligned and other developing countries in the field of training agricultural technical personnel in conformity with the purpose and mission of the non-aligned movement and on the principle of collective self-reliance.

Intensified Assistance to the Countryside in the Democratic People's Republic of Korea

In order to solve the serious food shortage facing the non-aligned and developing countries it is necessary for them to rapidly increase agricultural production under the revolutionary banner of self-reliance. In solving the food and agricultural question under the revolutionary banner of self-reliance in these countries it is of key importance to intensify the support of the state to the countryside.

In the Democratic People's Republic of Korea intensified assistance to the countryside was regarded as one of the basic conditions for the development of agriculture and all efforts were made to give active assistance to the countryside, thereby bringing about an uninterrupted upswing in agricultural production.

1. Intensified State Assistance to the Countryside Is a Basic Condition for Agricultural Development

Intensified assistance to the countryside is essential to rapidly consolidating the basis for agricultural production and to speeding up the overall development of agriculture.

The respected leader Comrade Kim Il Sung said:

"Agriculture can be equipped with modern techniques like industry only when industry, the leading sphere, gives it assistance, and the lagging countryside can rise to the level of the towns only when the towns, which are advanced, give it support."
(Kim Il Sung, *Selected Works*, Eng. ed., Vol. IV, p. 40.)

Intensifying assistance to the countryside means raising the level of the lagging countryside to that of the towns in all spheres through the assistance of industry, the leading sphere, to agriculture and the support of advanced towns for the countryside,

while giving priority to the political and ideological leadership of the working class over the peasantry.

Intensified assistance to the countryside is, above all, an essential prerequisite to equipping agriculture with modern techniques like industry and to the promotion of an overall development of agriculture. The steady consolidation of the foundations of agricultural production is an important requirement for the rapid growth of food and agricultural production and the acceleration of the development of agriculture. However, only industry can produce the technical means for the consolidation of material and technological foundations of agriculture. Therefore, only when industry turns out modern agricultural technical means in large quantities and supplies them to the countryside ceaselessly, can the material and technological foundations of agriculture be fortified.

Besides, agriculture has no financial capability to pay for all the modern technical means that industry produced. Now that agriculture has weaker material and technological foundations than industry, its labour productivity is low and its internal accumulation is not so much. Such a condition makes it imperative to intensify in every way the state support to the countryside in order to quickly improve the material and technological foundations of agriculture.

Intensified assistance to the countryside is also an essential demand to eliminate the cultural backwardness of the countryside and raise its cultural level to the advanced level of the towns. The towns are advanced over the countryside in all aspects of politics, economy and culture. Only when the advanced towns give the countryside an active support, can the cultural backwardness of the latter be rapidly abolished and the level of the countryside be raised to that of the towns.

It is an idea of the exploiter classes to neglect the countryside and squeeze it to construct only towns. In the past the foreign imperialists harshly exploited the countryside of developing countries. As a result, the countryside of these countries had no irrigation canals to speak of, and remained backward for centuries. Though the non-aligned and other developing countries have now enormous resources available for agricultural production, they are confronted with an acute food crisis because of the failure in their effective exploitation and utilization. This is because their countryside was bled white in the past colonial days. The revolutionary peoples advocating Chajusong should diametrically op-

pose the idea of neglecting the countryside and do their best to render positive assistance to the countryside.

2. Intensified Assistance to the Countryside in Our Country

Regarding intensified support to the countryside as one of the key problems in building an independent sovereign state, rich and powerful, the great leader Comrade Kim Il Sung wisely led our people to render wholehearted assistance to the countryside from the outset of building a new society. Under the wise leadership of the great leader an all-round assistance was given to our countryside in all aspects of material, technique, labour and finance.

1) Material and Technical Assistance to the Countryside

Intensification of material and technical assistance to the countryside was a very important question in our country. Because of the long-drawn feudal and Japanese imperialist colonial rule, not a single modern farm machine was introduced in our countryside and the peasantry engaged in farming by manual labour with such conventional farm implements as hoes and sickles. In these circumstances, rapid development of agriculture was impossible without powerful material and technical assistance to the countryside.

In order to strengthen material and technical assistance to the countryside, we saw to it that priority was given to the extensive development of the industry serving agriculture.

The industry serving agriculture is a material basis to assist the countryside. The problem of developing heavy industry for agriculture had to be solved before others with a view to laying a solid foundation for agricultural production through positive assistance to the countryside in our country where there was almost no heavy industry to equip agriculture.

In accordance with the original basic line of economic construction put forth by the respected leader Comrade Kim Il Sung, we solved successfully the problem of the heavy

industry serving agriculture by giving priority to the development of heavy industry.

In developing the heavy industry serving agriculture we accorded priority to the development of the industrial sectors for irrigation. It was because irrigation presented itself as the primary task for the technical revolution in our countryside.

In order to vigorously push ahead with the irrigation of agriculture it was imperative to develop heavy industry capable of turning out and supplying in large quantities building materials such as steel, cement and timber, building machinery such as excavator and bulldozer and mechanical power equipment including motor, transformer and pump.

We also concentrated great efforts on increasing power production by building many large power stations and medium and small ones in order to speed up electrification in the rural areas.

Particularly, great efforts were focussed on the production of modern farm machinery including tractors in the building of the heavy industry serving agriculture. What is most important in material and technical assistance to agriculture is to supply tractors and other up-to-date machinery and technical means. However, import of farm machinery from other countries needs colossal outlay of funds and in that way, the technical revolution cannot be hastened.

Tractors required for our rural technical revolution alone would amount to tens of thousands and if we import them it would take us scores of years even if we import thousands of tractors a year. Moreover if accustomed to importing machines from others, we would be unable to make them with our own efforts for good.

It was very difficult for us to produce tractors by ourselves under the situation in which the country's industrialization had not yet been carried out and equipment and techniques were not much available. Our working class and technicians, however, in the revolutionary spirit of self-reliance, disassembled a tractor and measured all its accessories one by one to draw out a blueprint of innumerable sheets and at last succeeded in turning out tractors in the course of strenuous struggle.

We also solved on our own the problem of producing chemical fertilizers and agricultural chemicals necessary for the chemicalization of agriculture.

Having advanced the slogan "Fertilizer precisely means grain and grain, socialism", the great leader Comrade Kim Il Sung

wisely organized and led our people to rebuild and enlarge the chemical fertilizer and agricultural chemicals factories which had been completely destroyed by the Japanese and US imperialists and to build new fertilizer factories fed on domestic raw materials and resources. As a result, we have now built a mighty heavy industry base capable of producing and supplying by itself all material and technical means necessary for equipping agriculture with modern technology.

By virtue of this, we established in every county such state enterprises as farm machine station, irrigation control office and land development office, bases for material and technical assistance to the countryside, and, through them, rendered powerful assistance to the rural areas.

It is very important in supplying the countryside with farm machinery and other material and technical means whether to allow farmers to purchase the material and technical means as theirs or to place the material and technical means belonging to the property of the entire people at their service through the establishment of state enterprises such as farm machine stations and irrigation control offices.

In order to rapidly consolidate the material and technological basis of agriculture through the powerful support for the countryside, it is necessary to make farmers use farm machines and the like through enterprises in the service of agriculture, instead of permitting them to purchase them. Only then can modern technical means be immediately supplied to the countryside irrespective of farmers' capacity of financial payment to strengthen the material and technological basis of agriculture and all the farms and regions be developed evenly and quickly without leaving any unit lagging behind. This is of advantage also to the future prospect for the development of agriculture.

The capital construction for consolidating material and technological foundations of our agriculture, too, is all carried out at state expense. This is an important manifestation of the fact that the state looks in a responsible manner after the consolidation of the economic foundations of the cooperative economy and the farmers' living.

From the initial period following the liberation all the large-scale projects were built at state expense and after the creation of the basis of industry all capital construction was undertaken by the state. Thus, the state is now directly undertaking all projects of capital construction including medium and small-river improvement works and construction of threshing grounds, drying

grounds, domestic animal sheds, storehouses and rural power stations which were formerly undertaken by the cooperative farms themselves. This increased investment in the rural areas and made rural construction be done in a more planned and rational way to rapidly strengthen the material and technological foundations of agriculture.

We have also trained a large number of technicians and experts at state expense and sent them to the countryside.

Putting agriculture on a modern scientific and technological basis gives rise to the needs of a huge army of technical personnel who have acquired advanced science and technology and skillfully handle modern technical means.

Regarding that the massive demand for agricultural technical personnel equipped with modern science and technology can only be met at state expense, we gave enormous state assistance to the training of rural technical personnel.

On the principle of placing educational work and cadre training ahead of all other work, we set up an agricultural university in each province and an agricultural college in each county to train a great number of technicians and specialists for the countryside. And the farming people are made to study at the correspondence courses established in universities and colleges while working and the training of engineers and assistant engineers is also carried on widely by thoroughly establishing a habit of studying among them and by making them take technical qualifying examinations. Besides, schools are set up in the capital and localities to bring up agricultural management personnel systematically, and many schools for training skilled workers for rural mechanization and other different sectors are established and run in counties.

As seen above, in our country, the state rapidly developed the heavy industry serving agriculture, supplied the technical equipment it produced to the countryside at its expense, directly undertook capital construction and trained and sent technicians and specialists to the countryside, thereby strengthening at a rapid pace the material and technological foundations of agriculture.

In our country at present there are powerful irrigation facilities with a large number of reservoirs and pumping stations, and various technical means including tractors, which are in the service of agriculture. All these were built or made at state expense without any charge to the farmers.

All the technicians and specialists working in the cooperative

farms were trained by the state. They now make up over 10 per cent of our rural labour force.

2) Labour Assistance to the Rural Areas

In order to develop agriculture not only material and technical assistance but also powerful labour assistance should be given to the countryside.

In our country farming is highly intensive and the mechanization of agriculture takes a long time on account of the peculiarity of our agricultural production.

Rice farming is main in our agriculture. In general, rice farming consumes more labour and is harder to mechanize than non-paddy farming. And our non-paddy farming, too, is difficult to mechanize for it is almost dependent on slope fields.

Under these circumstances, it is necessary for the rapid development of agricultural production to increase labour assistance to the rural areas.

In our country, the development of industry and agriculture at equal rapid pace causes constant labour strain, but a deep attention has been paid to providing enough labour power for the rural areas. In order to ease the strain on rural labour, a great number of senior middle school leavers were dispatched to our rural areas every year. And industry saved labour and non-productive structures were simplified to send a large number of hands to the rural areas.

Along with this, an all-people social labour assistance was given to the countryside when a great deal of labour was required in short periods. Unlike industry, farming is highly seasonal and requires timely performance of every process to reap a good harvest. Therefore, sometimes it needs concentrative investment of much labour in a short period of time. In our country it is now a beautiful social trait that the entire people turn out to assist the rural areas in busy farming seasons like the most labour-consuming rice-transplanting and harvesting seasons. Such helping hands alone amount to hundreds of thousands every year in our country.

Labour assistance to the rural areas is important not only for satisfactory farming but for increasing the influence of towns on the rural areas. When they come out to assist the countryside our factory and office workers, youth and students, working together with farmers, exert their influence upon them in all fields of

ideology, technique and culture and disseminate mechanical technology of industry and advanced culture.

3) Financial Assistance to the Countryside

Financial assistance to the countryside is of great significance in strengthening the material and technological foundations of agriculture and improving the farmers' material and cultural life.

In giving financial assistance to the countryside we paid deep attention to furnishing funds properly.

In our country the Peasant Bank was established already in the period of democratic revolution. It was a cooperative credit organ with capital stock held by the state and the peasants. By giving loans to the peasants at low interest, it greatly contributed to the proper farming of the peasants.

Since then our country has continuously developed financial operations in the countryside to meet the new requirements of the development of the revolution. Today in our country the state directly undertakes all the rural capital construction. Therefore, there is no need to finance the rural capital construction. But the rapid increase in agricultural production gives rise to the need of funds for ensuring the present farming. The state provides loans for this, thus giving farmers financial assistance.

In our country the state bears the burden of building modern houses for the farmers.

Building modern rural houses is an important undertaking to remove the centuries-old shanties in the countryside and ensure a cultured life to the farmers.

In order to solve the problem of the farmers' housing we organized rural construction corps, firmly built up local building-materials factories such as brick, roof-tile and slaked lime factories and constructed modern rural houses extensively.

During the last 17 years alone since the publication of the *Theses on the Socialist Rural Question in Our Country* by the great leader the state has constructed and provided to the farmers free of charge cosy and comfortable modern houses for over 957,000 households which include not a small number of two-storied modern houses equipped with various sanitary and cultural facilities.

As the state constructed many modern rural houses, public service facilities and cultural and welfare facilities to improve the farmers' living like this, our countryside of today is converted

into a cultured one better to live in, eradicating the past backwardness quickly.

Most important in strengthening the economic foundations of the cooperative farms and improving the farmers' livelihood was the complete abolition of the system of agricultural tax in kind.

The system of agricultural tax in kind was one of the tax systems by which the peasants delivered 25 per cent of their crop harvests to the state; it was introduced to improve the farmers' life and meet the demand of factory and office workers for food.

The respected leader Comrade Kim Il Sung advanced a great programme on abolishing all kinds of taxes at the Fourth Congress of the Workers' Party of Korea held in 1961 and saw to it that the agricultural tax in kind was abolished first of all. Thus, in our countryside the agricultural tax in kind was completely abolished in 1966. As a result of it the farmers came to enjoy great benefits from the state every year. Thus, the Korean farmers were freed from taxes for the first time in history.

Besides, our country raises the prices of purchasing agricultural products and reduces various rents to bestow a huge state benefit to the farmers.

In addition, the state provides conditions for the farmers to have winter holidays at its expense and supplies students and children with clothes according to seasons; and it supplied freely winter clothes to the farmers.

Immeasurable, indeed, is the assistance of the state given to the countryside to strengthen the material and technological foundations of agriculture and rapidly improve the peasants' livelihood from the first days of building a new society up to this day.

There is undoubtedly no country as ours in the world that directs such huge funds to the development of agriculture while accelerating revolution and construction and enforcing lots of communist policies such as giving free education to students making up more than half of the population and free medical treatment to all people in the tense situation in which it stands face to face with US imperialism.

That our country has eradicated the centuries-old backwardness of the countryside and achieved a rapid growth of agricultural production in a historically short span of time is a valuable fruition of the leadership of the working class over the peasantry, the assistance of industry to agriculture and the support of the towns to the countryside, which were given in spite of all difficulties from the first days after liberation.

Our people are now waging a vigorous struggle to hit the target of 15 million tons of grain in accordance with the programmatic task set forth by the great leader Comrade Kim Il Sung at the Sixth Congress of the Workers' Party of Korea.

We will, in the future, too, as in the past, carry out this honourable task with credit by giving powerful assistance to the countryside with all our efforts.

Construction of Socialist Rural Culture and Its Bright Prospects in the Democratic People's Republic of Korea

The construction of a modern countryside is an important component of the building of a new society. The countries building an independent, sovereign state after throwing off the imperialist colonial yoke are confronted with the urgent task of building a modern countryside.

The countryside lags behind the towns in all spheres of ideology, technology and culture. This is a legacy of the old society in which the countryside was plundered mercilessly. In order to abolish the lag of farm villages behind towns the ideological, technical and cultural revolutions should be promoted and the cultured living conditions ensured in the countryside.

Only then can we abolish the difference between town and country and the class distinctions between the working class and the peasantry, highly develop agricultural production, and achieve the final solution of the rural question.

1. Rise in the Cultural and Technical Standards of the Rural Working People

What is most important in building a new modern countryside is to speed up the cultural revolution in the countryside.

The respected leader Comrade Kim Il Sung said:

"The cultural revolution in the countryside is an important revolutionary task for elevating the cultural and technical standards of the peasantry, for training technical cadres for the countryside, for changing the old face of the rural areas, for liquidating all backward ways of living and customs and building a hygienic and cultured way of life." (Kim Il Sung, *Selected Works*, Eng. ed., Vol. IV, p. 53.)

In order to build a modern countryside, educational work should be conducted well to raise the cultural and technical standards of the peasantry and to train rural technical cadres; construction work should be stepped up to change the old appearance of the countryside; and the socialist way and revolutionary spirit of life should be established.

In this connection, priority should be given to the question of elevating the cultural and technical level of the peasants.

With a view to facilitating their colonial rule in Korea, the Japanese imperialists kept our farm villages in a backward state totally alien to modern civilization and kept our peasants ignorant and benighted. Before liberation the overwhelming majority of our rural population were illiterates who had had no taste of schooling.

If this situation was allowed to continue, it would be impossible to build a new countryside of material bounty, to develop the productive forces of agriculture, or to build a developed independent, sovereign state.

That was why, following the defeat of Japanese imperialism, a nationwide anti-illiteracy campaign was organized in our country, which was completed in a short span of time. And an all-people movement was conducted to build schools everywhere and train teachers. Thus began the education of our children who had been outcast from modern civilization, in order to fit them for the building of a new society.

Today all children in our countryside are reared and educated in nurseries and kindergartens at state and public expenses as in towns, and with the introduction of universal compulsory eleven-year schooling, they enjoy the benefits of free education up till their working age.

In our country there is not a single farm village without a school. In a remote mountain village, for instance, there is a school and teachers for only eight children, and in another secluded mountain village, 19 schoolchildren have a commuter train exclusively for themselves.

As is clear from this, all youngsters in our countryside are provided with favourable conditions to grow up to be reliable reserves of socialist and communist builders, knowledgeable, virtuous and strong-bodied. They are ceaselessly reinforcing and expanding the ranks of rural workers, rapidly elevating the general cultural and technical standards in the countryside.

As for the rural adults, the state could not say it had dischar-

ged its revolutionary duty merely by wiping out illiteracy from among them. In order to improve the general and technical knowledge of the peasants who had had no access to learning in the past, it was necessary to further strengthen adult education following the anti-illiteracy work. Therefore, it was seen to that working people's primary and middle schools were set up in all our farm villages so that the peasants might fully acquire general basic knowledge without leaving their production work and master more than one technical skill. As a result, our agricultural people now have technical knowledge above the level of the middle school graduate.

Since many specialized skilled workers training schools including agricultural mechanization personnel training schools were set up and run in the capital and provinces, the number of skilled agricultural workers increased rapidly.

Vigorous efforts are made to further strengthen adult education and the work of disseminating scientific and technical know-how in conformity with the demands of real life in which the rural technical revolution is forging ahead apace, so that all farmers, now equipped with a high level of knowledge and technique, skillfully handle up-to-date technical means and do farm work on a scientific basis as required by the Juche farming method.

If the general cultural and technical standards are to rise in the countryside, a large number of technical personnel should be trained and sent to the farms.

In our country technical cadres are trained in the overall cadre-training centres such as agricultural and medical universities and universities of education set up in all provinces, as well as in hydraulic, veterinary and livestock universities and they are sent to the countryside. Technical personnel are also trained in the agricultural college in each county. We train large numbers of technicians and specialists needed for the development of agriculture through correspondence education, a study-while-working system, in addition to the regular education system.

The University of National Economy and the central and provincial agricultural administration cadres training schools rear and send competent management officials to the countryside.

The technicians and specialists who are working in our countryside today are turning their technical know-how and wisdom to full account in the building of socialist rural culture.

2. The Building of Rural Culture

To change the old looks of the rural areas by speeding up construction work at state expense is one of the central tasks of the cultural revolution in the countryside and an indispensable requirement for the building of a prosperous new society. Only when a modern and civilized countryside is built up, can we bring the creative enthusiasm of the farmers into full play and arouse them for increasing food and agricultural production. This will expedite the building of a new society.

Changing the old looks of the rural areas is a colossal work requiring huge amounts of funds, materials and techniques. If we leave this gigantic work to the farmers alone, they will hardly be able to cope with it.

The state, therefore, invested funds, materials and techniques in capital construction and in social and cultural measures to bring about a radical change in the working and living conditions of the farmers.

First of all, we pulled down all the shabby huts in the countryside left over from the old society and built modern rural houses for farmers on an extensive scale at state expense. In the past 17 years since the publication of the rural theses alone, modern houses for over 957,000 families were newly built, thus fundamentally changing the old appearance of the countryside.

Another fundamental change in the farmers' living conditions has been brought about by the establishment of various cultural and welfare facilities which provides the rural population with as many living conveniences as those for the city dwellers.

Our countryside has already been provided with electric power, radio rediffusion and TV services; every farm has a well-furnished culture house and agricultural science and technology publicity hall; newspapers, magazines, books and many other publications are evenly delivered to all houses. This helps to steadily raise the political and ideological standards of the farmers. In all farm villages barber's shops, public bathhouses, laundries, clothes-mending houses, shops and other cultural and welfare facilities and public service establishments are functioning to provide conveniences to the rural population. The work of introducing bus service and water supply in the farm villages at state

expenses has been completed, and irrigation facilities, threshing grounds, livestock farms, farm-machine sheds, fertilizer and agricultural-chemical storages, grain elevators, fruit storages and various other facilities have been built on a large scale. As a result, the distinctions between town and country in the working and living conditions have been noticeably reduced.

The Party's prophylactic line has been fully implemented and the village clinics successfully converted into hospitals. This enables the rural population to enjoy free medical care as fully as the urban dwellers.

In the countryside hygienic and epidemic-prevention work, medical treatment and protection from diseases have been strengthened and living environments arranged in a more cultured and hygienic way. This has resulted in the eradication of various endemic infectious diseases which for ages used to cause sufferings to the peasants and take away their lives.

Many seasonal sanatoria and rest homes have been set up in hot- and mineral-spring resorts and other scenic spots for the farmers to take recreation and rest more comfortably.

Rural women are also given 77 days of paid maternity leave as in cities, and all the rural children are brought up happily in nurseries and kindergartens.

With the successful promotion of the building of rural culture, our once dirty and backward farm villages have completely shed their appearance and have been converted into clean and cultured modern socialist villages of material bounty.

3. Establishment of the Socialist Way and Sound Spirit of Life

In order to build a modern countryside, it is necessary to wipe out all the outdated modes of life and customs in the rural areas and establish a new way and a sound spirit of life.

The old way of life and customs are unscientific and unsanitary in many respects. They have come down for thousands of years, and are very conservative and remain deeply rooted in different aspects of life. They are obstructive to people shaping an independent world outlook and fostering their creative power. Furthermore, they do great harm to the building of a new society.

Therefore, in order to build a new society successfully, it is

necessary to eradicate the outdated way of life and customs remaining among the farmers by means of strenuous education and struggle.

In order to establish a new way and spirit of life in the countryside, we made efforts primarily to equip all farmers with the Juche idea and educate them in collectivism, so that they fulfilled their role and responsibilities with a high degree of consciousness as masters in building a new society.

Man is a social being and ideological consciousness determines his activities. Only when we firmly equip the farmers with the Juche idea and collectivist spirit by all means, will they use their strength and wisdom to the full for the sake of the state and society on the basis of a progressive and scientific world outlook and a high consciousness of independence.

We intensified the ideological education of the farmers so as to establish a new sound spirit of life in the countryside. Today our agricultural population place boundless trust in the great leader Comrade Kim Il Sung and the glorious Party centre who have brought them the happy life of today, and are thoroughly implementing the agricultural policy of the Party and the state, firmly rallied around them with one mind and one will.

In our country numerous literary and art works of high ideological and artistic value have been created which have brilliantly embodied in them the Juche-oriented thoughts and unique policy of the Workers' Party of Korea on literature and art. They forcefully inspire the working people to creative labour and the building of a new life. Besides, mass cultural and art work is developing widely in the countryside.

With social progress in our country, all state laws and regulations were newly enacted and education in the spirit of abiding by law intensified. At the same time, strenuous efforts were made to establish a new system and order and an advanced socialist way and a sound manner of life in all aspects of rural work and activity.

As a result, all outmoded ways of life and customs have now been cleared away in our countryside. All farming population, now the masters of the state and society equipped with lofty spiritual and moral qualities and a high level of culture, are living and working in a revolutionary way and in the collectivist spirit of "One for all and all for one!"

4. Brilliant Prospects for the Building of Rural Culture

Today our farmers are enjoying an independent and creative life to the greatest degree free from worries about food, clothing, shelter, medical care, schooling of their children and payment of taxes.

While further consolidating and developing the great successes already scored in the building of socialist rural culture, we are striving to put into effect the magnificent programme for the construction of a socialist countryside advanced at the Sixth Congress of the Workers' Party of Korea.

Vigorous efforts are being made to erase the difference between town and country by industrializing and modernizing agriculture and remarkably elevating the technical and cultural levels and living standards of the farming population as a whole.

With a view to carrying out the policy of intellectualizing the whole society as early as possible, we have set up many farm and other colleges on the study-while-working system and started a college on TV, in addition to further improving and strengthening the agricultural and other existing regular universities. This is an initial step towards providing compulsory higher education to all agricultural workers.

In the near future, all our farmers will attain the cultural and intellectual level of the university graduate and develop independent and creative activities on a completely equal footing at work places where there is no difference between mental and physical labour.

Investments and construction work will go on briskly at state expenses to further improve all the working and living conditions in the countryside.

Thus, in the near future our agricultural workers will be doing all farm work with the help of machines and chemicals and working eight hours a day, spending the rest of time on study and cultural recreation like factory workers.

Greater numbers of modern farm houses will be built to make all farm villages more attractive and comfortable places and all farmers will enjoy greater social benefits from the construction of more cultural and welfare facilities such as schools, hospitals, hou-

ses of culture, gymnasiums, rest homes and sanatoria. Further, thanks to the thorough implementation of the prophylactic medical policy, all sorts of diseases will disappear, people will come to enjoy better health and their average life span will be extended.

In the not distant future, the distinctions between urban and rural communities will vanish from our country and our rural areas will become more cultured and modern places, ideal to live in.

Increased Food and Agricultural Production Is a Decisive Factor Guaranteeing Chajusong of the Peoples of Non-Aligned and Other Developing Countries

1. Increased Food and Agricultural Production Is a Guarantee for the Chajusong of the Country and People

Food is a means of existence vital for man, the most valuable social being in the world.

Man is the most powerful being in the world. It is man who conquers nature, produces food and develops agriculture, and it is also he who develops science and technology.

People, the social beings, are eager to live independently, free from being shackled or subordinated to anyone and anything and for this, carry on their creative activities. Food and rural problem should be solved properly before others in order to provide independent and creative activities and life to the people.

The great leader Comrade Kim Il Sung said:

“Only when there is plenty of food, can a nation defend its Chajusong and say its say.” (Kim Il Sung, *Selected Works*, Korean ed., Vol. VIII, p. 206.)

The absolute majority of the population lives in the rural areas in the non-aligned and other developing countries. Agriculture makes the country rich and strong, improves the people's living standards and constitutes a key component of the independent national economy, the material basis for political independence. Only when unemployment and starvation are exterminated, can all members of the society participate in physical and intellectual labour for the creation of more material and cultural wealth.

The food and agricultural problem in the developing countries presents itself as a more urgent problem today under the

situation in which the US imperialists are using food as their political weapon for plunder of and aggression on other countries. Claiming that "Food is a weapon", "Cereal crisis offers good conditions to imposing the US intention on the other countries", "The surplus food makes the United States virtually decide the life and death of countless food-deficient people", the United States is threatening and blackmailing, appeasing and deceiving the developing countries by various forms and ways such as food embargo and suspension of "aid", etc.

Therefore, the prevailing food and agricultural problem is not merely an economic problem but a political problem to safeguard the Chajusong of the country and people.

Only when we have sufficient food through good farming can we consolidate national independence and firmly maintain the Chajusong of the country and people.

2. Food and Agricultural Crisis Is the Aftermath of the Colonial Predatory Policy of Imperialism

The food and agricultural problem acquires weighty significance for the Chajusong of the country and people. Nevertheless, the food and agricultural situation in the non-aligned and other developing countries is further deteriorated, far from being improved, with each passing day.

The 1979 Production Annual published by the FAO indicates that the non-aligned and other developing countries make up 73.3 per cent of the world population but they produce only 48.5 per cent of the world grain output. Their per-chongbo yields of major cereal crops and per-capita food output lag far behind the world average level.

**Developing Countries' Proportion in the World Food
Production and Their Level of Production**

	unit	world	developing countries	·%
population	million	4,335	3,180	73.3
arable land	million <i>chongbo</i>	1,326	677	51
land under grain cultivation	"	760	455	59.8
grain output	million tons	1,553	753	48.5
average per- <i>chongbo</i> grain yield	kg	2,041	1,654	81
per- <i>chongbo</i> yields of major cereal crops				
wheat	kg	1,782	1,463	82
rice	"	2,615	2,513	96
maize	"	3,271	1,697	51.8
barley	"	1,761	1,219	69.2
potato	"	15,503	10,245	66
per-capita output	-			
cereals	kg	358	236	65.9
meat	"	31	15	48.3
fruit	"	66	48	72.7

According to the data, over one billion people are suffering from hunger in the world and the number will be doubled in the 1980's. The majority of hunger-stricken people is the toiling people of developing countries in Asia, Africa and Latin America.

The developing countries exported food in the past. However, they imported 32 million tons of grain in the early 1960's and 42 million tons in the early 1970's and had to import about 100 million tons of grain in 1981. It is estimated that their imports of grain will amount to 200 million tons in 2000.

Food import gives rise to the ever-increasing exorbitant trade deficit of the developing countries. According to the data, the amount of debt of the poor developing countries is no less than 500,000 million dollars and the interests from it alone amount to 100,000 million dollars a year. Therefore, it is not fortuitous that the Summit Conference of the Organization of African Unity

held in May 1981 expressed its apprehension, stating that "if we do not conduct powerful and effective activities, only a few out of 50 member states of OAU will survive in the coming 10 years."

What is the root cause of the food and agricultural crisis in the non-aligned and other developing countries at present?

Some people try to find it out from the correlation between the growth of food and that of population, while others from the phenomena of the abnormal weather including drought and flood damages or from the fact that industrial development is not kept ahead of the development of agricultural production. Yet others think the cause is in the lack of political will on the part of the developed countries to assist developing countries. All these arguments sound reasonable. But none of them are enough to clear up the cause of the food crisis facing developing countries.

The prevailing food crisis in the developing countries is entirely the direct product of the colonial predatory policy of the imperialists who dominated these countries for a long time. Many developing countries have not yet abolished completely their colonial one-sidedness of agriculture such as one-crop cultivation method, with the result that their agriculture is inclined to the cultivation of some luxury and industrial crops.

Developing Countries' Proportion in the Production of Industrial and Luxury Crops (1979)

	world output (1,000 tons)	output of developing countries (1,000 tons)	%
groundnut	19,228	17,060	88.7
coffee	4,972	4,972	100
cocoa	1,585	1,585	100
tea	1,821	1,604	88
tobacco	5,444	3,477	63.8
sugar cane	754,130	686,477	91
cotton	41,104	22,508	54.7
jute	4,000	3,947	98.7
sisal	434	430	99
banana	39,192	38,403	98
pineapple	7,830	6,840	87.3

The area under crop cultivation to produce basic food holds an insignificant proportion of the developing countries' total arable land and the native technical cadres for the scientific and technical guidance to the cereal crop cultivation, too, are insufficient. In 1979 the per-capita area under crop cultivation in the developing countries was 0.14 *chongbo*, much less than that of the developed countries.

Arable Land and Area under Crop Cultivation per Capita (1979)

	unit	arable land	area under crop cultivation
world	<i>chongbo</i>	0.3	0.17
developed countries	"	0.55	0.26
developing countries	"	0.2	0.14

Many developing countries are switching over from the agriculture for export to that for food self-sufficiency, but the seriousness of the aftermaths of the imperialist colonial system throws many obstacles and difficulties on the way of the struggle for attaining self-sufficiency in food.

The prevailing food crisis in the developing countries is associated with the lag of the countryside behind the towns in all fields of ideology, technique, culture and the economy. This is also the infernal legacy handed down from imperialism and colonialism which dominated these countries for a long time. The imperialists and colonialists deliberately made the countryside dark and backward and did not carry out necessary socio-economic reforms. This was because only when the countryside was left far removed from modern civilization, could they bleed white and oppress freely the farming population and plunder the developing countries of all human and material resources at will. As a result, today there are no solid material, technical and cultural foundations to develop the agricultural productive forces rapidly in the countryside of many developing countries. Even the regions and countries which have possibilities to attain self-sufficiency in food have failed to solve the food problem and thus a great number of people suffer hardships and cannot eliminate the sources of national and social inequality.

Today many developing countries have attained their political independence out of the imperialist colonial slavery but the imperialists keep plundering these countries by relying on the old international economic order.

The great leader Comrade Kim Il Sung said:

"The old international economic order is a product of the colonialist system; it is an unjust order that only brings profits to great powers. The imperialists are relying on this old order in plundering the developing countries of their natural resources as they please and causing these countries economic difficulties."
(*Report to the Sixth Congress of the Workers' Party of Korea on the Work of the Central Committee*, Eng. ed., p. 90.)

The imperialists are pursuing the policy of "protectionism" that impedes the agricultural development of the developing countries; they take away from these countries valuable goods of agricultural raw materials produced at the cost of people's blood and sweat at low prices, and resell their processed goods to developing countries at exorbitant prices.

Imperialist monopolies are daily hiking sharply the prices of food, farm machines, agricultural chemicals, fertilizers and seeds that they sell to developing countries and the costs of shipping and technical service to them.

Some developed countries are not implementing the internationally agreed commitments on giving emergency aid to developing countries by establishing a food security system. It is not because they have no capabilities and possibilities to do so, but because they are attempting at ever more plunder and domination of the latter.

3. Ways for Food Self-Sufficiency

The non-aligned and other developing countries have inexhaustible reserves and possibilities to attain self-sufficiency in food, develop agriculture rapidly and consolidate their national independence and sovereignty.

What is most important here is to give full play to the consciousness of national independence and political enthusiasm of hundreds of millions of working masses who are building a new independent society free from the imperialist and colonialist domination and subjugation.

Today the developing Asian, African and Latin American countries are inhabited by 73.3 per cent of the world population and 91.4 per cent of the world farming population. In the past days, the imperialists and colonialists worked them hard as slaves and treated them as living labour forces working to get paltry pennies and food. But today the working masses of the developing countries which have won national independence are the masters of building of a new society and a decisive force of laying the independent foundations for food and agricultural production by remaking nature and developing resources.

Therefore, the developing countries should foster strength and talents of the farmers and entire people and bring their political zeal and initiative into full play for the building of a new society. The idea to neglect the countryside should be removed in all spheres of state management and social life and attention should be focussed on every assistance to the peasantry.

In many developing countries intensified state assistance is given to the elimination of illiteracy, training of national cadres, and to the introduction and consolidation of socio-economic reforms in conformity with the ideal of building a new society. These progressive reforms and state measures will be a source of strength which enables them to not only solve the food problem but also construct a new society with success by mobilizing the unlimited creative power of the farming population.

The non-aligned and other developing countries are endowed with inexhaustible resources to solve the food and agricultural problem satisfactorily.

The developing countries of Asia, Africa and Latin America

have 677.33 million hectares of vast arable land equal to 51 per cent of the world's arable land and much land resources to be developed in the future. And they have also a colossal amount of domestic animal resources and valuable resources of orchards ensuring over 53 per cent of the world's fruit production. Most of the world's luxury and industrial crops are produced in these areas.

In these areas there are immense resources of water including the world-famous large lakes and rivers, petroleum and rubber resources and inexhaustible resources necessary for producing fertilizers, agricultural chemicals and farm machinery. And there are also abundant resources of valuable gene necessary for accelerating the green revolution.

All these immense resources can be turned to good account for the food and agricultural production when the developing countries train their own native technical cadres and skilled workers in large numbers to develop science and technology and step up vigorously the rural technical revolution, the main contents of which are irrigation, electrification, mechanization and chemicalization, by bringing into full play the political enthusiasm and unlimited strength of the masses of people.

The great leader Comrade Kim Il Sung taught that fertilizer and water mean grain and that grain precisely means socialism.

Though there may be some differences according to the countries and regions priority should be given to the irrigation of agriculture in the rural technical revolution. It is because irrigation is the first and vital requirement of the realities of the developing countries themselves. The analysis of the agricultural situation in the developing countries bespeaks that the increase of crop yields is impeded by drought damages in some regions and by flood damages in other regions. When the crops are once affected by drought or flood damages because of poor irrigation, however excellent the mechanization and electrification of agriculture may be, they can hardly prove effective. The irrigation of agriculture is a nature-remaking project which can be fully undertaken through an all-people mass movement if it is provided with necessary materials, facilities and funds, even prior to realization of the country's industrialization.

Agricultural irrigation should be carried out in such a way as to set up an irrigation system for watering paddy and dry fields and a drainage system to drain unnecessary water from them.

It would be impossible for the developing countries to carry out the rural technical revolution all at once at the modern level

because they have not realized the country's industrialization. Therefore, they should adhere to the principle of beginning with the easy things which cost little and gradually developing it from lower to higher stage. And in developing industry, too, industry capable of serving agriculture and light industry should be built and, in particular, a great attention should be paid to the production of fertilizers.

In order to attain self-sufficiency in food, grain production should be increased first of all.

To increase grain production, the areas under high-yielding crop cultivation should be expanded on a large scale.

The composition of area under cereal crops in 1979 in the developing countries shows that rice takes up 30.8 per cent, wheat 23.4 per cent and maize 15.3 per cent respectively and barley, sorghum, millet, oats, rye and the rest.

Composition of Area under Staple Cereal Crop Cultivation and Per-*chongbo* Yields in the Developing Countries (1979)

	cultivation area (million <i>chongbo</i>)	composition (%)	per- <i>chongbo</i> yields (kg)
total	455.6	100	1,654
rice	140.4	30.8	2,513
wheat	106.7	23.4	1,463
maize	69.9	15.3	1,697
millet	50.3	11.0	617
sorghum	44.6	9.7	993

Rice and maize are the most stable and high-yielding crops in the developing countries. Therefore, the irrigation and drainage systems of paddies should be firmly established and rice strains and their cultivation techniques be improved to increase rice production.

It would be rational in cultivating dry-field crops to decisively increase the cultivated area of maize which gives higher per-*chongbo* yields than any other crops. The average per-*chongbo* yield of maize of the world was 3,271 kilogrammes in 1979 while that of the developed countries 5,447 kilogrammes. The developing countries are able to raise their per-*chongbo* yields of maize

to the present world average level if they increase the area under maize cultivation to over 100 million *chongbo* by enlisting all their reserves and possibilities and introduce and cultivate well varieties of its first filial generation adapted to their climatic and soil conditions. It would mean producing additional 200 million tons of grain, which would do much to overcome the present food crisis.

In order to correctly solve the food and agricultural problem, it is also necessary for the non-aligned and other developing countries to display the spirit of self-reliance.

Self-reliance means to maintain an independent stand of solving all problems for oneself on one's own responsibility in conformity with the specific conditions of one's country, rejecting dependence on others.

The people of the developing countries who are the masters of building a new society should decisively increase their food and agricultural production by giving full play to the spirit of self-reliance in order to fully satisfy the needs for such primary daily necessities as food.

Agriculture is a production sector which is greatly affected by geographical conditions. It is therefore a chief factor for success in agricultural production to solve the food and agricultural problem relying on the strength of one's own people by developing and making an effective use of one's own techniques and rich natural resources and in conformity with one's own actual conditions.

To adhere to the principle of self-reliance does not mean in any sense to repudiate cooperation with other countries nor to build an isolated closed economy. National self-reliance can prove greatly effective only when it is closely interlinked with collective self-reliance.

The non-aligned and other developing countries own rich natural resources, techniques and experiences available for mutual cooperation. They should, therefore, strengthen in every way mutual accommodation and cooperation among themselves on the principle of collective self-reliance.

Collective self-reliance furnishes a key factor for breaking down the old international economic order that only brings profits to the imperialists and colonialists and setting up a new one, and for the successful solution of the food and agricultural problem in the non-aligned and other developing countries. Displeased at the individual and collective self-reliance the imperialists are heaping slanders and vilifications on the efforts of the

developing countries to build an independent national economy and keep preaching about the "advantage" of the close combination of the industry and grain production of the developed countries with the traditional handicraft and the production of agricultural raw materials of the developing countries. We should thoroughly repudiate such theories and advocacies which are defamatory of the noble idea of individual and collective self-reliance.

4. Experiences of the Democratic People's Republic of Korea

In the past we, the Korean people, had suffered from harsh trials and hunger under the despotism of imperialism. The material and technological foundations of our agriculture were very backward during the period of colonial rule and medieval socio-economic relations were predominant in the countryside. The Japanese imperialists had plundered our peasants of all the rice they had reaped with painstaking efforts and even draught cattle and sold our people at high prices for food hulled millet and bean cakes they had imported from other countries.

It was not until the country's liberation by the respected leader Comrade Kim Il Sung that our people were freed from exploitation and oppression and embarked on the building of a new society.

Under the sagacious guidance of the great leader Comrade Kim Il Sung and the glorious Party centre, our people have built a firm independent national economy and a modern socialist countryside with credit in the spirit of self-reliance, making strenuous efforts under the banner of the Juche idea.

As we have pressed on along the road illuminated by the great leader Comrade Kim Il Sung in the *Theses on the Socialist Rural Question in Our Country*, irrigation and farm electrification have long been completed and comprehensive mechanization and chemicalization are now nearing completion. During the 17 years since the publication of the rural theses, over 957,000 modern rural houses have been built at state expense and all taxes abolished. The countryside has been served with radio-rediffusion and TV networks, bus service and water supply introduced in all farm villages, and rural clinics converted into hos-

pitals with credit. A huge army of cadres have been trained, so that an average of 57 technicians and specialists are at work in each cooperative farm. Agricultural science and technology of the country have made rapid progress. Thus, our country, which had only produced 2,167,000 tons of grain in the pre-liberation years, turned out 9 million tons in 1980 and the per-*chongbo* yields of rice increased from 2.5 tons to 7.2 tons and maize from 723 kilogrammes to 6.3 tons in the same period. This has made us self-sufficient in food and guaranteed our national independence and the Chajusong of the people.

Our experience shows that the non-aligned and other developing countries can increase their food and agricultural production several times in a short period if they exploit effectively all their domestic resources by drafting the strength of their people on the principle of self-reliance and strengthen mutual co-operation.

The Democratic People's Republic of Korea will actively help the peoples of the non-aligned and other developing countries in their efforts for self-sufficiency in food by letting them know its experience in the building of the countryside, particularly in irrigation work, the training of technical cadres, the green revolution and the development of the country's agricultural science and technology.

The day is sure to come when the non-aligned and other developing countries will no longer depend on the imperialists for food, will abolish the old international economic order which the latter established, tide over the food crisis for good and completely realize the Chajusong of their people.

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